

ASTOUNDING

SEPT. '40

SCIENCE-FICTION

A STREET & SMITH PUBLICATION

SEPTEMBER • 1940

20¢



EINSTEIN ECLIPSE

"Boys, in 1 minute through that door will come our new star salesman—"

JUST when we had got to thinking our sales were doing extra all right, J. P., the sales manager, whammed home the old body punch at the first-of-the-month meeting.

"Boys," he said, "in just one minute, through that door will come our new star salesman . . . and I expect every man to cooperate with him to the fullest."

No kiddin', a pin dropping would have sounded like an exploding bombshell. Jim Smith looked at me, I stared at Ed Johnson. What was going on? Who was this newcomer? What kind of a bird would he be? Who was going to be "fired"? J. P. sure had us in a dither—and I mean dither!

And then, through the door staggered the office boy carrying a tray as big as a cart wheel. On top of it stood twelve big, gleaming bottles of Listerine Antiseptic.

J. P. grabbed the nearest one off the tray and slammed it down on the desk.

"Here he is," he bellowed, "and none of you guys had better laugh, either. For a long time I've noticed that some of you men—and I'm not mentioning any names, all too frequently have a breath that would knock a cow down. It all adds up to this: *If I've noticed it, customers must have noticed it, too.* And that's bound to be bad for business. After coming up against a case of halitosis a couple of times, a customer is entitled to close the door on you—for keeps."

We all stirred uneasily.

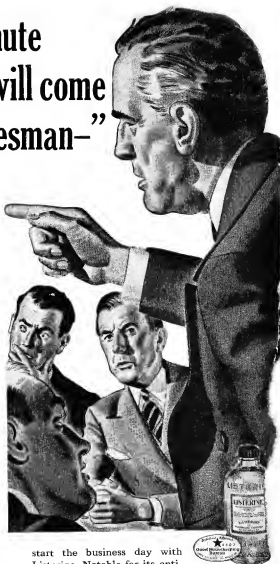
"From now on," J. P. continued, "this is an order; take a swig of Listerine Antiseptic every morning before you hit the street. Get that? Not now and then after a big night . . . but every morning. Step up, gentlemen, and get your bottle."

Maybe J. P. was right, and maybe it's only coincidence, but I'm doggoned if the sales for the next six months weren't better, in spite of a lot of tricky stuff from our competitors.

How's Your Breath?

In business, it's just common sense to take precautions that your breath doesn't offend. Odor seldom gets an order . . . often loses one.

More and more smart salesmen recognize this and



start the business day with Listerine. Notable for its antiseptic and deodorant power, Listerine renders the breath sweeter, fresher, purer.

Why not get in the habit of using Listerine Antiseptic yourself? It makes your mouth feel so wonderfully fresh and clean. The moment Listerine enters the oral cavity, it begins to halt the fermentation of tiny food particles which, some authorities say, is the principal cause of bad breath, then over comes the odors that fermentation causes.

Keep Listerine Antiseptic handy at home and in the office, and tuck a bottle in your bag when you travel. Rinse the mouth with it before every business and social engagement. It really pays! Lambert Pharmacal Co., St. Louis, Mo.

LISTERINE CHECKS HALITOSIS (Bad Breath)

TRAIN FOR A BETTER JOB IN ELECTRICITY

Pay Tuition After Graduation

ACTUAL WORK ON ACTUAL
ELECTRICAL MACHINERY

12 WEEKS SHOP TRAINING



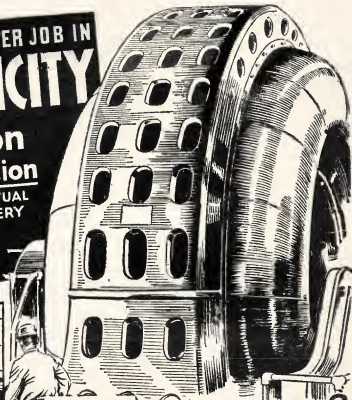
First you are told and shown what to do and how to do it. Then you do it yourself.



GET MY BIG
FREE
BOOK



Home of
Coyne
Electrical
School



LEARN TO EARN MORE?

My big free book tells you how we train you in 12 weeks for your start to a better job and better future.

Learn by Doing

You get your training not by book or lessons but on actual electrical machinery and equipment.

Get Training First— Pay Tuition Later

You can get your training first and then pay for it in 12 monthly payments starting 5 months after you start school or 60 days after your 12 weeks training period is over. Mail coupon for all the details of this plan.

Earn While Learning

Lack of money need not stop you. You can get training first and pay after graduation and if you are short of money for living expenses we will help you get a part time job while training.

Previous Experience or Advanced

Education Not Necessary

You don't need any previous elec-

trical experience or advanced education to get my training.

Graduate Employment Service

After graduation every graduate is given employment help, consultation help and many other services to help him make a success of his training.

4-Weeks Extra Radio Course Included

Right now I am including an extra 4 weeks course in Radio. This training is given you at no extra tuition cost.

Get My Complete Story

Fill in and clip the coupon below. Then mail it to me. When I receive it I'll send you my big free book and all the details of the features I have outlined here.

This will not obligate you in any way and no salesman will call on you as I do not employ salesmen.

You owe it to yourself and your future to get these facts now.

So don't put it off—mail the coupon now.

COYNE ELECTRICAL SCHOOL 500 S. PAULINA ST.
Dept. CO-45, CHICAGO

MAIL THE COUPON NOW

H. C. LEWIS, President, COYNE ELECTRICAL SCHOOL,
500 S. Paulina Street, Dept. CO-45, Chicago, Ill.

I'm really in earnest. I do want to get ahead. Send me your big free catalog with full particulars about Coyne training and your plans to help a fellow, who hasn't a lot of money, to get ahead.

Name.....

Address.....

City.....State.....

ASTOUNDING

SCIENCE-FICTION

TITLE REGISTERED U. S. PATENT OFFICE

CONTENTS SEPTEMBER, 1940

VOL. XXVI NO. 1

The editorial contents of this magazine have not been published before, are protected by copyright and cannot be reprinted without the publisher's permission.

SERIAL

SLAN **A. E. van Vogt** 9

Part One of Four Parts

A tale of a superman—but in this case, a nine-year-old boy with a reward on his head who has seen his mother shot down! The first serial to win Astounding's rare NOVA designation.

NOVELETTE

BLOWUPS HAPPEN **Robert Heinlein** 51

Men had to have that atomic power—and expected the plant to blow most of the Southwest off the map at any time!

SHORT STORIES

QUIETUS **Ross Rocklynne** 86

Two, seeking intelligent life, make a terrible error—because of a matter of form!

THE KILKENNY CATS **Kurt von Rachen** 98

If two groups that hate each other are marooned together, one having food, the other water and weapons—

HOMO SOL **Isaac Asimov** 117

The humanoids of the Galaxy didn't like the ways of Man—but a psychologist pointed out they'd have to like 'em or change 'em—fast!

EMERGENCY **Vic Phillips** 143

Man relearns an old but important principle—motorboats are comfortable, but it's wise to keep the primitive oars handy!

ARTICLES

UNIVERSES FOR LENSES **R. S. Richardson** 41

The inspiration of our cover, this article describes a present path of astronomical research so bold in conception not even science-fictionists thought it up!

THE CORONAVISER **Stanley R. Short** 132

An explanation of the first application of electronics and television principles to the telescope—and of the thousand applications of the theory involved to other uses.

READERS' DEPARTMENTS

THE EDITOR'S PAGE 5

IN TIMES TO COME 50

Department of Prophecy and Future Issues.

ANALYTICAL LABORATORY 50

An Analysis of Readers' Opinions.

BRASS TACKS AND SCIENCE DISCUSSIONS 156

The Open House of Controversy.

Illustrations by M. Isip, R. Isip, Kramer and Schneeman

COVER BY ROGERS

All stories in this magazine are fiction. No actual persons are designated either by name or character. Any similarity is coincidental.

Monthly publication issued by Street & Smith Publications, Incorporated, 79 Seventh Avenue, New York City. Allen L. Grammer, President; Oswald V. Good, Vice President; Henry W. Reardon, Vice President; Gerald H. Smith, Treasurer and Secretary. Copyright, 1940, in U. S. A. and Great Britain by Street & Smith Publications, Inc. Registered as Second-class Matter, February 7, 1938, at the Post Office at New York, under Act of Congress of March 3, 1879. Subscriptions to Canada and Countries in Pan American Union, \$2.25 per year; elsewhere, \$2.75 per year. We cannot accept responsibility for unsolicited manuscripts or artwork. Any material submitted must include return postage.

Printed in the U. S. A.

STREET & SMITH PUBLICATIONS, INC. • 79 7th AVE., NEW YORK

NEXT ISSUE
ON SALE
SEPT. 20th
\$2 per YEAR
20c per COPY

FULL CYCLE

When Robert Heinlein submitted "Blowups Happen," I had certain misgivings; it's a grand yarn, but with the knowledge of Uranium power reactions advancing at a headlong pace, I rather wondered what the situation would be when the story appeared. New knowledge might have made it silly—

New knowledge did. At the time last issue was put together, Arthur McCann's article—which, though received later than "Blowups Happen" was, because of its shorter length, fitted into the magazine sooner—represented the latest knowledge. On that basis, it was clear that blowups needn't be feared—certainly no such blowup as Heinlein pictured.

Now the blowup is back in the picture. Still newer knowledge indicates that maybe the blueprints need some more changing. As McCann explained, it seemed that a mass of Uranium-235 surrounded with water would react about as follows: a stray neutron, produced naturally by cosmic rays or other accidental source would start things. One neutron entering one U-235 atom would cause it to fission, giving rise to two or three, which would be slowed down to cause further reaction and produce four to nine new neutrons—and explosions.

This would be a controllable reaction because the U-235 fission produces *fast* neutrons, and only *slow* neutrons can cause the explosion of the atom. Something which would slow the neutrons would be necessary, U-235 atoms being unable to do this before the neutrons wandered away. The rate of the reaction could, then, be controlled by supply or removing the neutron-slowing material—water.

The prime difficulty seemed to be in controlling the deadly wash of gamma rays which would inevitably accompany the reaction, for gamma rays are highly penetrant, and highly injurious to human life. McCann pointed out that Uranium metal itself would be the most efficient gamma stopper possible if it weren't that, being radioactive, it emits them naturally! Incidentally, McCann pointed out that the commercial power-equipment companies—such as G. E. and Westinghouse—were quite apt to do much of the remaining engineering needed before atomic power becomes a commercial fact.

McCann guessed better than he knew. Westinghouse has now announced, through its atomic research department, the discovery that U-235

atoms stop gamma rays—and fission as a result! Not only will slow neutrons bring about the frightful violence of the Uranium fission, but so will the rays produced by that fission!

And—the important point!—no second, outside material is necessary to make the fission-gamma-ray-fission cycle possible. The cycle fission-fast-neutron-water-slow-neutron-fission is controllable because it can be broken from outside; remove the water and the action ends.

Now comes the somewhat delicate question: if the gamma cycle is pretty inefficient, and the neutron cycle efficient, the reaction is still controllable if the amount of U-235 used isn't too large. Then—what's "too large"? Also, there's a lower limit. If you don't use a sufficiently large mass of U-235, too many of the neutrons will escape, and you will not have the necessary self-supporting reaction.

The thing desired, evidently, is a nice balance between the two. For if that gamma-ray cycle once got really started—Heinlein's guess as to what would happen is quite soundly based.

Something of a "fuller explanation department" might be attached. If it is desired to determine the rate of pressure rise, maximum pressure, and rate of pressure decline in the breech of a big gun, various pressure-measuring instruments of an electrical nature can be attached and wired to a cathode-ray oscillograph. An oscillograph can quite accurately measure time intervals of fractions of a millionth of a second. If for some reason it were desirable to do so, it would be possible to set up an electrically controlled apparatus capable of feeding explosive into a gun breech at such a rate that the pressure maintained during the firing at a predetermined level, since electrical currents react at velocities enormously higher than the speed of explosion of molecular substances.

But nuclear reactions—atomic-power reactions—are as vastly faster than electrical currents as the electrical currents are faster than chemical reactions. An electron smashing across a cathode-ray tube under 50,000 volts is crawling across inches of space beside a gamma-ray photon, traveling at the ultimate speed—light speed—across the micro-micro distance from one atom to the next.

Trying to control atomic reactions by electrical means is like trying to control the explosion of nitroglycerin by reports brought by pony-express messengers.

In any case—Heinlein's got a yarn!

THE EDITOR.



I Jumped My Pay from \$18 to \$50 a Week!

Here's how I did it

by S. J. E.
(NAME AND ADDRESS
SENT UPON REQUEST)



"I had an \$18 a week job in a shoe factory. I'd probably be at it today if I hadn't read about the opportunities in Radio and started training at home for them."



"The training National Radio Institute gave me was so practical I was soon ready to make \$5 to \$10 a week in spare time servicing Radio sets."



"When I finished training I accepted a job as serviceman with a Radio store. In three weeks I was made service manager at more than twice what I earned in the shoe factory."



"Eight months later N.R.I. Graduate Service Department sent me to Station KWCR as a Radio operator. Now I am Radio Engineer at Station WSTU. I am also connected with Television Station WEXX."



"N. R. I. Training took me out of a low-pay shoe factory job and put me into Radio at good pay. Radio is growing fast."



J. E. SMITH,
President
National Radio
Institute
Est. 25 Years

Find out today how I Train You at Home to BE A RADIO TECHNICIAN

NOW to Investigate Radio. Trained Radio Technicians make good money, and you don't have to give up your present job or leave home to learn Radio. I train you at home nights in your spare time.

Why Many Radio Technicians Make \$30, \$40, \$50 a Week

Radio broadcasting stations employ engineers, operators, technicians. Radio manufacturers employ testers, inspectors, foremen, servicemen in good-pay jobs. Radio jobbers, dealers, employ installation and servicemen. Many Radio Technicians open their own Radio sales and repair businesses and make \$30, \$40, \$50 a week. Others hold their regular jobs and make \$5 to \$10 a week fixing Radios in spare time. Automobile, Police, Aviation, Commercial Radio; Loudspeaker Systems, Electronic Devices are other fields offering opportunities for which N.R.I. gives the required knowledge of Radio. Television promises to open many good jobs soon.

Many Make \$5 to \$10 a Week Extra in Spare Time While Learning

The day you enroll, I start sending you Extra Money Job Sheets which start showing you how to do Radio repair jobs. Throughout your Course I send plans and directions which have helped many make \$5 to \$10 a week extra in spare time while learning. I send special Radio equipment to conduct experiments and build circuits. This 50-50 training method makes learning at home interesting, fascinating, practical. I ALSO GIVE YOU A MODERN, PROFESSIONAL ALL-WAVE, ALL PURPOSE SET SERVICING INSTRUMENT to help you make money

fixing Radios while learning and equip you for full time work after you graduate.

Find Out What Radio Offers You Act Today! Mail the coupon for my 64-page book, "Rich Rewards in Radio." It points out Radio's spare time and full time opportunities and those coming in Television; tells about my Course in Radio and Television; shows more than 100 letters from men I have trained, telling what they are doing and earning. Read my money back agreement. MAIL COUPON in an envelope or paste on a penny postcard—NOW!

J. E. SMITH, President, Dept. DHD
National Radio Institute, Washington, D. C.

MAIL NOW - Get 64 page book FREE



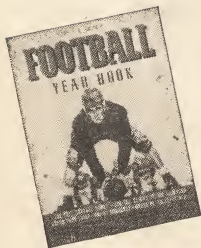
J. E. SMITH, President, Dept. DHD,
National Radio Institute, Washington, D. C.

Mail me FREE, without obligation, your 64-page book, "Rich Rewards in Radio." (No salesman will call. Write plainly.)

Name
Address
City State

Age

BE YOUR OWN EXPERT!



Find the answers to your Saturday's football problem as nearly as football can be doped. Facts presented on all leading football teams in every section of the country by the leading football expert in that section. The inside dope gathered and analyzed by the best-informed experts in every section.

If you can read, you can figure out the winners ... as nearly as football can be doped.

THE EXPERTS who'll help you pick 'em:

Charles Moran, Editor, Football Year Book
Noted football authority

Stanley Woodward, Sports Editor, N. Y.
Herald Tribune

Arthur Sampson, Football Expert, Boston
Herald

James S. Kearns, Football Editor, Chicago
Daily News

Paul Zimmerman, Sports Editor, Los Angeles
Times

Les Goates, Sports Editor, Salt Lake City
Desert News

Jack Troy, Sports Editor, Atlanta Constitution

Lorin McMullen, Sports Editor, Fort Worth
Star-Telegram

Clyde McBride, Sports Editor, Kansas City
Star

The most informed work on gridiron strength available during this football season.

STREET & SMITH'S

FOOTBALL YEAR BOOK

ON SALE AUGUST 30th 25 C PER COPY

SLAN

By A. E. van Vogt



SLAN

By A. E. van Vogt



The first serial to win Astounding's rare NOVA designation, van Vogt's great story presents the tale of a superman—but a superman story such as science-fiction has never before seen!

Illustrated by Schneeman

His mother's hand felt cold, clutching his.

Her fear, as they walked hurriedly along the street, was a quiet, swift pulsation that throbbed from her mind to his. A hundred other thoughts beat against his mind, from the crowds that swarmed by on either side, and from inside the buildings they passed. But only his mother's thoughts were clear and coherent—and afraid!

"They're following us, Jommy," her brain telegraphed. "They're not sure, but they suspect. Somebody reported us, and our house has already been raided. Jommy, if the worst comes, you know what to do; we've practiced it often enough. And, Jommy, don't be afraid, don't lose your head. You may be only nine years old, but a nine-year-old slan is as intelligent as any fifteen-year-old human being. Don't be afraid, no matter what happens."

Don't be afraid! Easy to advise, Jommy thought, and hid the thought from her. She wouldn't like that concealment, that distorting shield between them, but there were thoughts that had to be kept back. She mustn't know he was afraid, too.

"Jommy, do you feel their hostility? Can you sense things over a distance yet?"

He steadied. The steady wave of

vagueness that washed from the crowds pressing all around grew into a swirling nightmare of mind clamor. From somewhere came the stray wisp of thought:

"They say there are still some slans alive in this city, in spite of all precautions; and the order is to shoot them on sight."

"But isn't that dangerous?" came a second thought, obviously a question asked aloud, though Jommy caught only the mental picture. "I mean, a perfectly innocent person might be killed by mistake."

"That's why they seldom shoot on sight. They try to capture them and then examine them. Their internal organs are different from ours, you know, and their heads—"

"Jommy, can you feel them, about a block behind us? In a big car! Waiting for reinforcements to close in on us from in front. They're working fast—too fast. Can you catch their thoughts, Jommy?"

He couldn't! No matter how hard he reached out with his mind and strained and perspired with the fierceness of his trying. That was where her mature powers surpassed his precocious instincts. She could span distances and disentangle remote vibrations into coherent pictures.

He wanted to turn around and look, but he didn't dare. His small,

though long legs twinkled underneath him, half running to keep up with his mother's impatient pace.

It was terrible to be small and helpless, young and inexperienced, when the very fabric of their life demanded the full strength of maturity, the straining alertness of adult slant mentality.

His mother's thoughts stabbed through his hard reflections! "There're some ahead of us now, Jommy, and others coming across the street. You'll have to go now, darling. Don't forget what I've told you. You live for one thing only: To make it possible for slants to live normal lives. I think you'll have to kill our great enemy, Kier Gray, even if it means going to the grand palace after him. Remember, there'll be shouting and confusion, but keep your head. When people are confused it's easy to fool them. Good luck, Jommy."

Not until she released his hand, after one quick squeeze, did Jommy realize that the tenor of her thoughts had changed. The fear was gone. A soothing tranquillity flowed from her brain, quieting his jumping nerves, slowing the pounding of his two hearts.

AS JOMMY slipped with effortless glide into the shelter made by a man and woman walking rapidly past them, he had a brief glimpse of men bearing down on the tall, graceful figure of his mother.

Men in civilian clothes were crossing the street with a quiet purposefulness, their faces dark with an expression of an unpleasant duty that had to be done. The thought of that unpleasantness, the hatred that went with it, was a shadow in their minds that leaped out at Jommy; and it puzzled him even in this tremendous moment when his best

wits were concentrated on escape.

Why was it necessary that he should die? He and this wonderful, sensitive, intelligent mother of his! It was all wrong, terribly wrong.

A car, glittering like a long jewel in the sun, flashed up to the curb. A voice lashed out from it; a man's harsh voice and harsher accompanying thought, that stabbed after Jommy:

"Stop! There's the kid! Don't let that kid get away! Stop that boy!"

People stopped and stared; he felt the bewildered mildness of their thoughts; and then he had rounded the corner and was racing along Capitol Avenue. A car was pulling from the curb. His feet pattered with mad speed; his abnormally strong fingers caught at the rear bumper. He pulled himself aboard and hung on as the car swung into the maze of traffic, and then fought clear, and plunged along the smooth pavement. From somewhere behind came the thought:

"Good luck, Jommy!"

For nine years she had schooled him for this moment, but something caught in his throat as he replied:

"Good luck—mother!"

The car went too fast, the miles reeled off too swiftly. Too many people paused in the street and stood staring at the little boy clinging so grimly and precariously to the shining bumper. He felt the intensity of their stares, the leaping thoughts that whipped into their minds, and brought jerky, shrill shouts to their lips. Shouts at a driver who didn't hear.

Vague mists of thought followed him then—of people who ran into public booths and telephoned the police about a little boy caught on a bumper. Jommy squirmed, and his eyes waited for a patrol car to

swing in behind and flag the speeding auto to a halt. In a frenzy of alarm he concentrated his mind for the first time on the car's occupants.

Two brain vibrations poured out at him; and, as he caught the icy thoughts of the men inside, a cold shudder throbbed through Jommy. In terror, he half lowered himself toward the pavement, prepared to let go. He looked down—and dizzily pulled himself back into place. The pavement was a gray, sickening blur, distorted by the car's reckless speed.

Reluctantly his mind fumbled into contact again with the brains of the men in the car. The thoughts of the driver were concentrated on his task of maneuvering the machine. The man thought once flashingly of a gun he carried in a shoulder holster. His name was Sam Enders, chauffeur and bodyguard to the man beside him—John Petty, chief of the secret police of the all-powerful Kier Gray.

The other man's identity penetrated through Jommy like an electric shock. The notorious slan hunter sat relaxed, indifferent to the speed of the car, his mind geared to a slow, meditative mood.

Extraordinary mind—impossible to read anything in it but the flimsiest stream of surface pulsations. It wasn't, Jommy thought amazed, as if John Petty could be consciously guarding his thoughts. But there was a shield here as effective in hiding true thoughts as any slan's. Yet it was different. Overtones came through that told of a chill, remorseless character, a steel-hard, dominating man, a highly trained and brilliant brain—and suddenly there was a tail end of thought, brought to the surface of a flurry of passion that shattered the man's calm:

"—I've got to kill that slan girl,

Kathleen Layton. That's the only way to undermine Kier Gray—"

Frantically Jommy attempted to follow the thought, but it was gone into the shadows, out of reach. His brain hummed. A slan girl named Kathleen Layton to be killed so that Kier Gray might be undermined.

"Boss," came Sam Enders' thought, "will you turn that-switch? The red light that flashed on is the general alarm."

John Petty's brain remained indifferent. "Let them alarm," he snapped. "That stuff is for the sheep."

"Might as well see what it is," Sam Enders said.

THE CAR slackened infinitesimally as he reached the far end of the switchboard; and Jommy, who had worked his way precariously to one end of the bumper, waited desperately for a chance to leap clear. His eyes, peering ahead over the fender, saw only the long, bleak line of pavement, unleavened, by grass boulevards, hard and forbidding. To leap would be to smash his small body against unyielding concrete.

As he drew back hopelessly, a storm of Enders' thoughts came to him as Enders' brain received the message on the general alarm:

"—all cars on Capitol Avenue and vicinity watch for boy holding onto bumper of a sixty electro Studebaker. Boy is believed to be a slan named Jommy Cross, son of Patricia Cross, who was killed ten minutes ago at the corner of Main and Capitol. The boy leaped to the bumper of a car, which drove away rapidly, witnesses report—"

"By golly, boss," snapped Sam Enders, "we're on Capitol Avenue. We'd better stop and help in the search. There's ten thousand reward for slans."

Brakes screeched; the car decelerated with a sickening speed that crushed Jommy hard against the rear end. He tore himself free of the intense pressure and, just before the car stopped, lowered himself to the pavement; his feet jerked him into a run. He darted past an old woman, who clutched at him, avarice in her mind; and then onto a vacant lot beyond which towered a long series of blackened brick and concrete buildings, the beginning of the wholesale and factory district.

A thought leaped after him from the car, viciously: "Enders, do you realize this is a sixty electro Studebaker, and that we left Capitol and Main ten minutes ago. That boy—There he is! Shoot him, you fool!"

The sense of the man Enders drawing his gun came so vividly to Jommy that he felt the hissing rasp of metal on leather in his brain. Almost, he saw the man take aim, so clear was the mental impression that bridged the hundred and fifty feet between them.

Jommy ducked sideways as the gun went off with a dull *plop*. He had the faintest awareness of a blow; and then he had scrambled up some steps into an open doorway, into a great, dark-lit warehouse. Dim thoughts reached out from behind him:

"Don't worry, boss, we'll wear that little shrimp out!"

"You fool, no human being can tire a slan—" He seemed to be barking orders then into a radio: "We've got to surround the district at 437th Street. . . . Yes, near the outskirts. . . . Concentrate every police car and get the soldiers out to—"

It WAS strange how blurred everything was becoming. Jommy stumbled on through a dim world,

conscious only that, in spite of his tireless muscles, a man could run at least twice as fast as his best speed would carry him.

The vast warehouse was a dull light-world of looming box shapes, and floors that stretched into the remote semidarkness. Twice the tranquil thoughts of men moving boxes somewhere to his left impinged on his mind. But there was no awareness of his presence in their minds, no knowledge of the uproar outside. Far ahead, and to his right, he saw a bright opening, a door. He bore in that direction.

He reached the door, vaguely amazed at his weariness. Something damp and sticky was clinging to his side, and his muscles felt queerly stiff. His mind wouldn't think straight. He paused and peered out the door.

He found himself staring onto a street as different from Capitol Avenue as Hades from heaven. A hopeless, dingy street of cracked pavement, the opposite side lined with ill-painted houses and crumbling old tenements. The street seemed deserted. A vague whisper of thought crept forth from the miserable buildings; he was too tired to make absolutely certain the thoughts came only from the buildings.

Jommy lowered himself over the edge of the warehouse platform and dropped to the hard cement of the road below. Anguish engulfed his side, and his body had no yield in it, none of the normal spring that would have made such a jump easy to take. The blow of striking the walk was a hard, jarring thump that vibrated his very bones.

The world was queerly darker as he raced across the street. He shook his head to clear his vision, but it was no use. He could only scamper on with leaden feet, between a ram-

shackle two-story house and a towering ruin of a brick tenement.

He didn't see the woman on the veranda of the house, or sense her, until she struck at him with a mop. The mop missed because he caught its shadow above him at the last instant.

"Ten thousand dollars!" she screamed after him. "The radio said ten thousand—and its mine, do you hear? Don't nobody touch him. He's mine. I saw him first."

He realized dimly that she was shouting at other women who were pouring out of the tenement. Thank God the men were away at work!

The horror of the shrill, raucous, rapacious minds snatched after him as he fled with frightened strength along the cement walk beside the tenement. His dulled mind shrank from the hideous thoughts; and his ears flinched from the most horrible sound in the world: the shrill voice clamor of people desperately poor, swarming in their dozens after wealth beyond the dreams of greed.

Wave after wave of sick dismay poured through Jommy. The deadly fear of being smashed by mops and hoes and brooms and rakes, his head beaten, his bones crushed, flesh mashed—that was what drove him on, even now when the peace of death would bring a welcome relief from this deadly misery and torment of life.

Swaying with the strange weakness that blurred his vision, Jommy rounded the rear corner of the ugly tenement. The swarming, muttering mob was still behind him. He felt their nervousness in the turgid thoughts that streamed from them. They had heard stories about slans that suddenly almost overshadowed the ravening desire to possess ten thousand dollars.

But the mob presence gave cour-

age to individuals. The mob pressed on.

He emerged into a tiny back yard piled high with empty boxes on one side. The pile swayed above him, a dark mass, blurred even in the dazzle of the sun. An idea flashed into his dulled mind, and in an instant he was climbing up the pile.

The pain of the effort was like teeth clamped into his side. He ran precariously along over the boxes, and then half lowered himself, half fell into a space between two old boxes. The space opened all the way to the ground. In the almost darkness his eyes made out a deeper darkness in the brick wall of the tenement. He put out his hands and fumbled around the edges of a hole in the brick.

In a moment he had squeezed through and was lying exhausted on the damp earth inside. Pieces of rock pressed into his body, but for the instant he was too weary to do anything but lie there, scarcely breathing, while the mob raged outside in frantic search.

THE DARKNESS WAS soothing, like his mother's thoughts just before she had told him to leave her. Somebody climbed some stairs just above him; and that told him where he was—in a little space underneath back stairs, which was probably why the hole had never been mended.

Lying there, cold with fear, he thought of his mother—dead now, the radio had said. Dead! She wouldn't have been afraid, of course. He knew only too well that she had longed for the day when she could join her dead husband in the peace of the grave. "But I've got to bring you up, Jommy. It would be so easy, so pleasant, to surrender life, but I've got to keep you alive in a

hate-filled world until you're past this helpless state of childhood. Your father and I have spent our whole lives working on his great invention, and it will have been all for nothing if you are not here to carry on—"

He pushed the thought from him because his throat suddenly ached from the thinking of it. His mind was not so blurred now, as if the rest had done him good. Strangely, that made the rocks on which he lay more annoying, harder to bear. He tried to shift his body, but the space was too narrow.

Automatically one hand fumbled down to them, and he made a discovery. They were bricks, not rocks. Bricks that had fallen inward when the little section of the tenement wall collapsed and made the hole through which he had crawled.

It was odd to be thinking of that hole and to realize that somebody else—*somebody out there*—was thinking of the same hole. The shock of that blurred outside thought was a flame that scorched through Jommy.

Appalled, he fought to isolate that thought and the mind that held it. But there were too many other minds all around, too much excitement. Soldiers and police swarmed in the alleyway, searching every house, every block, every building. Once above that confusion of mind static he caught the clear, cold brain of John Petty:

"You say he was last seen right here?"

"He turned the corner," a woman shrilled, "and then he was gone!"

With shaking fingers Jommy began to pry the bricks out of the damp ground. He forced his nerves to steadiness and began with careful speed to fill the hole with bricks,

using damp earth in place of the usual cement. The job, he knew with sick certainty, would never stand close scrutiny.

And all the time he worked he felt the thought of that other person out there, a sly, knowing thought, hopelessly mingled with the wild current of thoughts that beat on his brain. Not once did that somebody else stop thinking about this very hole. Jommy couldn't tell whether it was man or woman. But it was there, like an evil vibration from a warped brain.

The thought was still there, dim and menacing, as men pulled the boxes half to one side and peered down between them—and then, slowly, it retreated into distance as the shouts faded, and the swirling nightmare of thoughts receded farther afield. The hunters hunted elsewhere. For a long time Jommy could hear them, but finally life grew calmer; and he knew that night was falling.

SOMEHOW the excitement of the day remained in the atmosphere. A whisper of thoughts crept out of the houses and from the tenement flats, people thinking, discussing what had happened.

At last he dared wait no longer. Somewhere out there was the mind that had *known* he was in the hole and had said nothing. An evil mind that filled him with unholy premonition, and an urgency to be away from this place.

With swift, yet fumbling fingers, he removed the bricks. Then, stiff from his long vigil, he squeezed carefully out of the hole. His side twinged from the movement, and a surge of awful weakness blurred his mind, but he dared not hold back. Slowly he pulled himself to the top of the boxes. His legs were lower-



An adult slon could outrun any human—but Jommy was nine years old, with a bullet in his side—

ing to the ground when he heard the rapid footfalls—and the first sense of the person who had been waiting there struck into him.

A thin hand grabbed his ankle, and an old woman's voice croaked triumphantly: "That's right, come

down to Granny. Granny'll take care of you, she will. Granny's smart. She knew all the time you could only have crept into that hole; and those fools never suspected. Oh, yes, Granny's smart. She went away and then she came back, and,

because slans can read thoughts, she kept her mind very still, thinking only of cooking; and it fooled you, didn't it? She knew it would. Granny'll look after you. Granny hates the police, too."

With a gasp of dismay, Jommy recognized the mind of the rapacious old woman who had clutched at him as he ran from John Petty's car. That one fleeting glimpse had impressed the evil old one on his brain. And now, so much of horror breathed from her withered, twisted brain, so hideous were her intentions, that he gave a little squeal and kicked out at her.

The heavy stick in her free hand came down on his head, even as he realized for the first time that she had such a weapon. The blow was mind-wrecking. His brain spun; his muscles jerked in spasmodic frenzy; his body slumped to the ground.

He felt his hands being tied, and then he was half lifted, half dragged for several feet. Finally he was lifted onto a creaking, rickety old wagon, and covered with clothes that smelled nauseatingly of horse sweat, oil and garbage cans.

The wagon moved over the rough pavement of the back alley, and above the rattling of the wheels Jommy caught the old woman's snarl: "What a fool Granny would have been to let them catch you. Ten thousand reward! Bah! I'd never have gotten a cent. Granny knows the world. Once she was a famous actress, now she's a junk woman. They'd never give a hundred dollars, let alone a hundred hundred, to an old rag and bones picker. Bah upon the whole lot! Granny'll show them what can be done with a young slan. Granny'll make a huge fortune from the little devil—"

II.

UGH, there was that nasty little boy again!

Kathleen Layton stiffened defensively, then relaxed where she stood at the five-hundred-foot battlements of the palace. It should be easy, it *was* easy after these long ten years as the only slan among so many hostile human beings, to face anything—even horrible eleven-year-old Davy Dinsmore.

She wouldn't turn. She wouldn't give him the faintest intimation that she knew he was coming along the broad, glass-inclosed promenade. Rigidly she held her mind away from his, maintaining the barest safety contact, necessary to keep him from sneaking upon her by surprise. She must keep right on looking at the city, as if he weren't there.

The city sprawled in the near distance before her, a vast reach of houses and buildings, qucerly shadowed, seemingly dead and inarticulate in the gathering twilight, yet somehow alive. In the farther distance the green plain looked darker green, and the blue, gushing water of the river that wound out of the city seemed blacker, shiningless, in that sunless world. Even the mountains on the remote, dimming horizon had taken on a somber hue, a dark, grim moodiness that matched the black melancholy in her own soul.

"Ya-a-a-ah! You better take a good look. It's the last time you'll see it. Ya-a-ah!"

The harsh, discordant, hateful voice rasped on her nerves like so much screeching, senseless noise. For a moment, so strong was the suggestion of completely unintelligible sounds that the meaning of the words did not penetrate to her consciousness. And then—in spite of

herself, she jerked around to face him.

"Last time! What do you mean?"

Instantly she regretted her action. Even noticing this sadistic creature was a victory for him. And yet—what could have made him say a thing like that? Incapable of imagination, he couldn't have thought of such words himself.

The brief impulse to investigate further in his mind seized her. She shuddered. No, entering that queer, unclean, twisted little mind would sicken her whole outlook for a month.

It was a long time now, months and months, since she had cut herself off from mental contact with the hideous stream of human thoughts, human hopes and human hates that made an unrelenting hell of the palace atmosphere. Better to scorn the boy now, as she had in the past.

She turned her back on him, and her slightest of slight connections with his brain brought her the overtones of the rage that surged through him at the action. And then there was his jangling voice again:

"Ya-a-ah, the last time! I said it, and I mean it. Tomorrow's your eleventh birthday, isn't it?"

Kathleen made no answer, pretended she hadn't heard. But a tingling sense of disaster pierced her unconcern. There was too much gloating in his voice, too much certainty.

Was it possible that dreadful things had been going on, dreadful plans made, during these months that she had kept her mind insulated from the coarse thoughts of these people? Was it possible she had made a mistake in locking herself away in a world of her own? And now the real world had

smashed through her protective armor?

Davy Dinsmore snapped: "Think you're smart, don't you? Well, you won't feel so smart when they're killing you tomorrow. Maybe you don't know it yet, but mamma says the word is going around the palace now that when they first brought you here, Mr. Kier Gray had to promise the cabinet he'd kill you on your eleventh birthday—and don't think they won't do it, either. They killed a slan woman the other day in the street, a Mrs. Cross. That shows! What do you think of that, smarty?"

"You're—crazy!" The words were forced from her lips. She hardly realized she had uttered them, because they weren't what she thought. Somehow, she did not doubt for a single instant that he spoke the truth. It fitted in with their mass hatred; it was so logical that she seemed, suddenly, always to have known it.

ODDLY ENOUGH, it was the mention of his mother having told Davy that held Kathleen's mind. It took her memory back three years to a day when this same nasty little boy had attacked her under the benevolent eyes of his mother, thinking to bully a little girl. What a surprise, what a screaming and kicking with fear there had been, as she held him aloft, until his outraged parent had come charging forward, uttering threats of what she was going to do to "a dirty, sneaking little slan."

And then, suddenly, there had been Kier Gray, grim and tall and powerful; and Mrs. Dinsmore cringing before him.

"Madam, I wouldn't lay a hand on that child if I were you. Kathleen Layton is a property of the State, and in due course the State

will dispose of her. As for your son, I happened to observe the entire proceedings. He got exactly what every bully deserves, and I hope he has learned his lesson."

How she had thrilled at his defense of her! And after that she had put Kier Gray in a separate category in her mind to that occupied by other human beings, in spite of his ruthlessness, in spite of the terrible stories about him. But now she knew the truth, and that he had meant no more than he said: "—the State will dispose of her—"

With a start, she emerged from her bitter reverie and saw that in the city below a change had taken place. The whole great mass had donned its nighttime splendor with a billion lights, twinkling in gorgeous panorama.

Wonder city now, it spread before her, a vast, sparkling jewel, an incredible fairyland of buildings that reared grandly toward the heavens and blazed a dream picture of resplendent magnificence.

How she had always longed to go into that mysterious city and see for herself all the myriad delights her imagination had built up. Now, of course, she would never see it. An entire world of glory would remain unseen, untasted, unenjoyed, while she was shoved unceremoniously into her grave.

"Ya-a-a-ah!" came that discordant voice again. "Take a good look. It's your last."

Kathleen shivered. She couldn't stand the presence of this . . . this wretched boy another second. Without a word she turned away and went down into the palace, down to the dreary loneliness of her bedroom.

SLEEP came hard, and it was late. Kathleen knew it was late because the mind clamor of outside thoughts

had dimmed and people were long gone to bed, except for the guards, the nervous, and the night hounds.

Funny, she couldn't sleep. Actually, she felt easier, now that she knew. The day-to-day life had been a horrible strain, the fury hatred of the servants and most of the other human beings a bewildering nightmare.

She must have dozed finally, for the harsh thought that came to her from outside did queer, twisting things to the unreal dream she was having.

Kathleen stirred restlessly. The slant tendrils—thin strands of burnished gold that glistened dully in the semilight against the dark hair that crowned her finely molded, childish face—lifted clear of her hair and waved gently, as if a soft breeze had caught them. Gently, yet with a curious, tense insistence.

Abruptly the menacing thought those sensitive antennae drew out of the night-enveloped palace of Kier Gray penetrated to her brain. Kathleen awakened, quivering in every nerve and muscle.

The thought lingered in her mind for an instant, distinct, cruel, cold-bloodedly murderous, shocking the sleep from her like a douche of ice water.

And then it was gone, as completely as if it had never existed. There remained only a dim confusion of mind pictures that washed in a never-ending stream from the countless rooms of the vast palace.

Kathleen lay very still, and from the depths of her own mind there came the cold realization of what this meant. Somebody was not waiting until tomorrow, somebody doubted that her execution would take place. And he intended to present the council with an accomplished fact. There could be only

one such person powerful enough to face any consequences: John Petty, the dreaded head of the Secret Service, the fanatic antislan; John Petty, who hated her with a violence that was dismaying even in this den of antislans. The assassin must be one of his henchmen.

With an effort, she quieted her quivering nerves and strained her mind out, out, to the utmost limit of her powers. The slow seconds dragged, and still she lay there, groping, searching for the rapacious and cunning brain whose thoughts had for a brief flash threatened her life.

THE WHISPER of outside thoughts became a roar that beat into her with a throbbing fury that seared her shrinking brain like flame. It was months since she had explored that world of unsuspecting, uncontrolled minds. She had thought the memory of its horrors had not dimmed. Yet the reality was worse than the memory. Grimly, with an almost mature persistence, she held herself in that raging storm of mind vibration, fighting to isolate each individual pattern in turn. A sentence came:

"Oh, God, I hope they don't find out he's cheating. Today, on the vegetables—"

That would be the wife of the assistant chef, wretched, God-fearing woman, who lived in mortal terror of the day when the petty thievery of her sly husband would be discovered.

Briefly, Kathleen felt sympathy for the tortured little woman lying awake beside her husband out there in the darkness; but not too much sympathy, for that little woman had once, on sheer, vicious impulse, paused as Kathleen was passing her in a corridor and, without prelimi-

nary mental warning, slapped her hard in the face—

Kathleen's mind pressed on, driven now by a mounting sense of urgency. Other pictures flitted through her brain, a veritable kaleidoscope, brushed aside almost at the moment of entry as unwanted, unrelated to the grim, personal menace that had awakened her. There was the whole world of the palace with its intrigues, its countless personal tragedies, its hard ambitiousness.

Dreams with psychological implications there were from people who tossed in their sleep. And there were pictures of men who sat scheming far into the night and—

Abruptly, then, it came, a wisp of crude purpose, the hard determination to kill *her!* Instantly it was gone again, like an elusive butterfly, only not like that at all. The deadliness of it was like a spur that roweled her to desperation. For that second flash of menacing thought had been too powerful for it to be anything but near, terribly, dangerously near.

Amazing how hard it was to find him again. Her brain ached, her body felt cold and hot by turns; and then a stray picture came for a third time—and she had him.

And now she understood why his brain had evaded her so long. His thoughts were so carefully diffused, deliberately flashing to a thousand different subjects, seeming simply overtones to the confusion of mind noises all around.

He must have practiced it, but even so, he wasn't a John Petty or a Kier Gray, either of whom could hold rigidly to a line of reasoning without once slipping up. Her would-be assailant, in spite of all his cleverness, had given himself

away. As soon as he entered the room she would—

THE THOUGHT broke off. Her mind soared toward disintegration with the shock of the truth that showered in upon her:

The man *was* inside her bedroom, and was at this very instant creeping on his knees toward her bed.

A curious sense of time suspension came to Kathleen as she lay there. It grew out of the darkness, and the way the blankets held her down, covering even her arms. There was the knowledge that the slightest move would rustle the stiff sheets. He'd rush her then before she could move, pin her down under the blankets and have her at his merciless power.

She couldn't move, she couldn't see; she could only feel the gathering excitement that pulsed through the mind of the assassin. His thoughts were quicker, and he had forgotten to diffuse them. The flame of his murder purpose was a burning thing within him, so fierce and powerful that she had to turn part of her mind away because it was suddenly like a physical hurt.

And in that full revelation of his thoughts, Kathleen read the story of the attack. This man was the guard who had been posted outside her door. But it wasn't the usual guard. Odd she hadn't noticed the change. They must have been switched while she slept—or else she had been too upset by her own thoughts.

She caught his plan of action as he rose up on the carpeted floor and bent over the bed. For the first time her eyes caught the dim flash of the knife as his hand drew back for the plunge.

Only one thing to do; only one thing she *could* do! With a swift, firm heave, she flung the blankets

up over the head and shoulders of the startled man. Then she was sliding out of the bed—a shadow among the shadows of the room.

Behind her, the man uttered a faint cry as the blankets so furiously flung by her small, extraordinarily strong arms, enveloped him. There was dismay in that low, surprised yell, and the first wild fear of what discovery would mean.

She caught his thoughts, heard his movements as he leaped the bed in a single violent jump and began flailing out with his arms, searching the dark reaches of the room.

Queerly, then, the thought came that she shouldn't have left the bed. If death were to come tomorrow anyway, why delay it? But she knew the answer in the surging will to live that swept her; and in the thought, for the second time, that this midnight visitor was proof that someone who wanted her dead feared there would be no execution.

She drew a deep breath. Her own excitement was submerging in the first formulations of contempt for the clumsy efforts of the assassin.

"Your fool," she said, her child's voice hot with passionate disdain, yet immensely unchildlike in its stinging logic, "do you actually believe that you can catch a slane in the darkness?"

It was pitiful the way the man leaped in the direction from which her words came and beat with smashing fists in every direction. Pitiful and horrible because his thoughts were ugly now with the terror that swept in turgid flood tide through him. There was something unclean in such fear that made Kathleen shiver where she stood in her bare feet at the opposite side of the room.

But there was a murder ferocity about it, too, that made her feel

very brave as she snapped angrily in her high, childish voice: "You'd better leave before somebody hears you stumbling around. I won't report you to Mr. Gray if you leave right away."

The man didn't believe her, she saw in his whirling, distorted brain. There was too much fear in him, too much suspicion, and suddenly—cunning!

With a muttered curse he stopped searching for her, and flung himself recklessly toward the door, where the light switch was located. She felt him draw a gun as he groped for the switch; and realized anew the strength of his desperate determination to kill her. He preferred to take the dangerous chance of attempting to escape the guards, who would come running at the sound of a gunshot, to meeting his superior with a confession of failure.

"You silly fool!" said Kathleen.

She knew now what she must do, in spite of never having done it before. Soundlessly she slid along the wall, fingers searching. Then she had opened a paneled door, slipped through it, locked it behind her, and raced along a dim-lit private corridor to a large door at the end. It opened at her touch onto a large, luxuriously furnished office room.

HALF FROZEN with sudden terror at the boldness of her action, Kathleen stood in the doorway, staring at the tall, powerful-looking man who sat at a desk writing by the light of a shaded desk lamp. Kier Gray did not look up immediately. She knew after a moment that he was aware of her presence, and she took courage from his silence to observe him.

There was something magnificent about this ruler of men that held her admiration even now, when the

fear of his cold, ruthless personality lay like an icy weight inside her. The strong, handsome features of the man formed an almost noble countenance in the thoughtful way it was bent over the letter he was writing.

As he wrote, she was able to follow the surface of his thought, but nothing else. For Kier Gray, she had found out long ago, shared with that most hateful of men, John Petty, the ability to think in her presence without deviation, in a manner that made mind reading a practical impossibility. Only those surface thoughts were there, the words of the letter he was writing; and her excitement and impatience overrode any interest in his letter. She burst out:

"There's a man in my room. He tried to kill me."

Kier Gray looked up. His face held a harder expression now that it was turned full upon her. The noble qualities of the profile were lost in the determination and power of that lean, strong jaw. Kier Gray, master of men, stared at her coldly.

When he spoke, so closely was his mind and voice co-ordinated that she wasn't sure whether he had actually uttered any words or not, his mind had such preciseness of movement.

"An assassin, eh? Go on."

The story poured from Kathleen's lips in a trembling stream of words that covered everything that had happened from the time Davy Dinsmore had mocked at her on the battlements.

"So you think John Petty is behind it?" he asked.

"He's the only one who could have done it. The secret police-control the men who guard me."

He nodded slowly, and she sensed the faintest tension in his mind.

Yet his thoughts were deep and calm and slow.

"So it's come," he said softly. "John Petty's bid for supreme power. I almost feel sorry for the man, he is so blind to his own shortcomings. No chief of secret police has ever held the confidence of a people. I am worshiped and feared; he is only feared. And he thinks that all-important."

KIER GRAY's brown eyes looked gravely into Kathleen's. "He intended to kill you in advance of the date fixed by the council, because I could do nothing about it once it was done. And my helplessness to act against him, he knew, would lower my prestige with the council." His voice was very low now, as if he had forgotten Kathleen's presence and was thinking out loud. "And he was right. The council would only be impatient if I tried to force an issue over the death of a slan. And yet, they would take nonaction as proof that I was afraid. Which would mean the beginning of the end. Disintegration, a splitting into groups growing gradually more hostile to each other as the realists sized up the situation and picked the probable winner, or started that pleasant game known as playing both ends against the middle."

He was silent a moment, then he continued: "As you can see, Kathleen, a very subtle and dangerous situation. For John Petty, in order to discredit me with the council, has been very assiduous in spreading the story that I meant to keep you alive. Accordingly, and this is the point that will interest you—for the first time a smile broke over the bleak lines of Kier Gray's face—"accordingly, my prestige and position now depend upon

my ability to keep you alive in spite of John Petty."

He smiled again. "Well, what do you think of our political situation?"

Kathleen's nostrils dilated with contempt. "He's a fool to go against you, that's what I think. And I'll help you all I can. I *can* help, with reading minds and things."

Kier Gray seemed to become more jovial every minute. He was still smiling—a broad smile that lighted up his whole countenance and erased the harsh lines from his face.

"You know, Kathleen, we human beings must seem very queer at times to slans. For instance, the way we treat you. You know the reason for that, don't you?"

Kathleen shook her head. "No, Mr. Gray. I've read people's minds about it, and nobody seems to know why they hate us. There's something about a war between slans and human beings long ago, but there were wars before that, and the people didn't hate each other afterward. And then there are all those horrible stories too absurd to be anything but dreadful lies."

He said: "You've heard what slans do to human babies?"

"It's one of the silly lies," Kathleen snapped back contemptuously. "They're all dreadful lies."

He chuckled. "I can see you have heard about it. And this may shock you: Such things do happen to babies. What do you know about the mental outlook of an adult slan, whose intelligence is three hundred percent higher than a normal human being? All you know is that you wouldn't do such things, but you're only a child. Anyway, never mind that now. You and I are in a fight for our lives. The assassin has probably escaped from your room by now, but you just have to look into his mind to identify him.

"We'll have our showdown now. I'll get Petty here, and the council. They won't like being awakened from their beauty sleep, but to hell with them. You stay here. I want you to read their minds and tell me afterward what they thought during the investigation."

He pressed a button on his desk and said curtly into a little boxlike instrument: "Tell the captain of my personal guard to come to my office."

III.

IT WASN'T easy to sit there under the dazzling lights that had been turned on. The men looked at her too often; and their eyes were cold and wary, their thoughts an icy mixture of impatience, cunning and mercilessness—and no pity for her anywhere. From each one of the eleven councilors came a chill fury of deadly hostility to her that brought the first wave of real fear she had felt.

There was too much hatred; it weighed upon her spirit, dimmed the very life that throbbed through her sensitive nerves. They wanted her dead, wanted it with a hate that was ingrained in the very texture of their emotions. And before that mind chant of death, death, death—before those beating execution hammers of their thoughts, her spirit cringed. Appalled, she closed her eyes and turned her mind away, and tried to flatten herself back into her chair, as if by sheer will power she might make her body invisible.

But it didn't help. There was so much at stake, she dared not miss a single word or thought. Her eyes and mind jerked open, and there it was again—the room, the men, the whole incredibly menacing situation, real as life itself.

John Petty stood up abruptly and

said: "I object to the presence of this slan at this meeting on the grounds that her innocent, childlike appearance might influence some of us to be merciful."

Kathleen stared at him wonderingly. The chief of the secret police was a heavily built man of medium height, and his face, that was rather corvine than aquiline, and the slightest degree too fleshy, showed not a trace of kindness. Kathleen thought: Did he really believe *that*? These men merciful—for any reason!

She tried to read behind his words, but his mind was blurred—deliberately—as his dark, powerful face was expressionless. She caught the faintest overtone of irony; and realized with a jangling thrill that John Petty understood the situation perfectly. This was his bid for power; and his whole body and brain were alert and deadly with the tremendousness of the knowledge.

Kier Gray laughed dryly; and suddenly Kathleen caught the glow of this man's magnetic personality. There was a tigerish quality about the leader, immensely fascinating, a flamelike aura that made him alive as was no one else in the room. He said:

"I don't think we have to worry about . . . about our kindly impulses overpowering our common sense."

"Quite right!" said Mardue, minister of transport. "A judge has to sit in the presence of the accused."

He stopped there, but his mind carried the sentence on: "—especially if the judge knows in advance that the judgment is death." He chuckled softly to himself, his eyes cold.

"Then I want her out," snarled John Petty, "because she's a slan, and by Heaven, I won't have a slan

sitting in the same room with me!"

The answering surge of collective emotion to that popular appeal struck Kathleen like a physical blow. Voices rose up, raging:

"You're damned right!" "Put her out!" "Gray, you've got an almighty nerve waking us up like this —" "The then council settled all this eleven years ago. I didn't even know about it till recently." "The sentence was death, wasn't it?"

THE veritable hail of voices brought a grim smile to Petty's face. He glanced at Kier Gray. The two men's eyes crossed like rapiers preliminary to a deadly thrust. It was easy for Kathleen to see that Petty was trying to confuse the issue. But if the leader felt himself losing, it was not visible in his cold, impassive face; nor did a ripple of doubt flicker into his mind as he said:

"Gentlemen, you're under a misapprehension. Kathleen Layton, the slán, is not on trial here. She is here to give evidence against John Petty, and I can well understand his desire to have her out of the room."

John Petty's amazement then was a little overdone, Kathleen analyzed. His mind remained too calm, too icily alert, as his voice took on a bull-like roar:

"Well, of all the damned nerve! You've wakened all of us out of our sleep to pull a two-o'clock-in-the-morning surprise trial on me—on the evidence of a slán! I say you've got an almighty nerve, Gray; and, once for all, I think we should settle right now the juridical problem of whether a slán's word can be taken as evidence of any kind."

There it was again; the appeal to basic hatreds. Kathleen shivered before the waves of answering emotion that swept out from the other men. There was no chance for her

here, no hope—nothing but certain death.

Kier Gray's voice was almost stolid as he said: "Petty, I think you should know that you're not talking now to a bunch of peasants whose minds have been roused by propaganda. Your listeners are realists, and, in spite of your obvious attempts to befuddle the issue, they realize that their own political and perhaps physical lives are at stake in this crisis which you, not I, have forced upon us."

His face hardened into a thin bleak line of tensed muscles. His voice took on a harsh rasp.

"I hope that everyone present will wake up from whatever degree of sleep, emotionalism or impatience controls him to realize this: John Petty is making this bid to depose me; and no matter who wins between us, some of you are going to be dead before morning."

THEY weren't looking at her now. In that suddenly still room, Kathleen had the eerie sensation of being present, but no longer visible. It was as if an intolerable weight had been removed from her mind, and she could see and feel and think for the first time with normal clarity.

The silence in that fine oak-paneled room was mental as well as sonal. For a bare moment the thoughts of the men were blurred, diminished in intensity. It was as if a barrier had been flung up between her mind and theirs, for their brains worked on deep, deep inside them, exploring, gauging chances, analyzing the situation, tensing against a suddenly realized, deadly danger.

Kathleen grew abruptly aware of a break in the blur of thoughts—a clear, sharp, mental command to her: "Go to the chair in the corner,

where they can't see you without twisting their heads. Quick!"

One glance Kathleen flung at Kier Gray. She saw his eyes almost glaring at her, so fierce was the blaze in them. And then she had slipped off her chair without a sound, obeying him.

The men didn't miss her, weren't even aware of her action. And Kathleen was conscious of a glow, the first wild leap of hope as she realized that Kier Gray, even in this moment of terrific strain, was coldly playing his cards, not missing a single trick. She caught his thought, heard him say:

"Of course, there is no absolute necessity for executions, provided John Petty once and for all gets out of his head this insane desire to replace me."

It was impossible now to read the real thoughts of the men as they stared speculatively at Kier Gray. For the moment, each man was too alert; all their minds were briefly as controlled as was John Petty's and Kier Gray's, their whole consciousness was concentrated on what they *should* say and *should* do.

Kier Gray went on, the faintest tinge of passion in his voice: "I say insane because, though it may seem that here is simply a squabble for power between two men, it is more than that. The man who has supreme power represents stability and order; the man who wants it must, the moment he attains power, secure himself in his position. This means executions, exiles, confiscations, imprisonment, torture—all, of course, applied against those who have opposed him, or whom he distrusts.

"The former leader cannot simply step down into a subordinate role. His prestige never actually vanishes—as witness Napoleon, Hitler,

Tharg—therefore he remains a permanent danger. But a would-be leader can simply be disciplined and put back on his job. And that is my plan for John Petty."

He was, Kathleen saw, appealing to their cautious instincts, their fear of what change would involve. Her thoughts broke off as John Petty sprang to his feet. For a moment he was off guard, but so great was his rage that it was as impossible to read his thoughts as if he still was in full control of his mind.

"I think," he burst out, "I have never heard such an extraordinary statement from a presumably sane man. He has accused me of befuddling the issue. Gentlemen, have you realized that he has as yet produced no issue, no evidence? All we have are his statements, and the dramatic trial which he has sprung on all of us in the middle of the night, when he knew that most of us would be dozy from sleep. I must confess that I'm not fully awake yet, but I am, I think, awake enough to realize that Kier Gray has succumbed to that gnawing disease of the dictators of all ages—the persecution complex. I have no doubt that for some time past he has read into our every word and action some threat against his position.

"I can hardly find words to express my dismay—my utter consternation—at the thought of what this means. With the slant situation so desperate, how could he even suggest that one of us would precipitate disunion? I tell you, sirs, we cannot afford even the hint of a split at the present time. The public is on edge over the monstrous worldwide activity of the slans against human babies. Their attempt to slantize the human race, with its resultant, horrible failures, is the greatest problem that has ever con-

fronted a sorely tried government."

He turned to Kier Gray; and Kathleen felt a chill at the perfection of his acting, the apparent sincerity of the words that he spoke: "Kier, I wish I could forget what you have done; first, this baseless trial, then the threat that some of us will be dead before morning. It was the rankest intimidation; under the circumstances, I can only suggest that you resign. You no longer have my confidence, at least."

Kier Gray said with a thin smile: "You see, gentlemen, we now come to the core of the problem. He wants my resignation."

A tall, thin, youngish man, with a hawklike face, spoke up harshly: "I agree with Petty. Your actions, Gray, have shown that you no longer are a responsible person. Resign!"

"Resign!" cried another voice, and suddenly it sounded like a bedlam chorus: "Resign! Resign! Resign!"

To Kathleen, who had been following John Petty's words with utter concentrated attention, the words and the harsh accompanying thoughts sounded like the knell of doom.

THE NOISE of the malevolent voices, the pulsation of the even more malevolent thoughts, throbbed through her brain like so many violent physical wrenches. It was all so deadly, so completely merciless, each mind intent only on self, the whole a mad confusion. A long moment passed before she realized that four of the seated ten had done all the shouting.

Her mind straightened painfully. So that was it. By crying "Resign!" over and over, they had hoped to stampede the doubtful and the fearful, and, for the time being, had failed. Her mind and her eyes

flashed toward Kier Gray, whose very presence had kept the fearful from yielding to panic.

Just looking at him brought a return of courage. For there he sat, a little straighter in his chair now, looking taller, bigger, stronger; and on his face was a cold, ironical, confident smile.

"Isn't it odd," he asked quietly, "how the four younger men rally to the support of young Mr. Petty? I hope that it is obvious to the older gentlemen present that here is advance organization, and also that there will be firing squads before morning because these young firebrands are transparently impatient of us old fogies—for, in spite of my being in their age level, they do regard me as an old foggy. They're wild to throw off the restraint we have exercised, and are, of course, convinced that by shooting the oldesters they will only hasten by a few years what nature would, in any event, manage to do in the course of time."

"Shoot 'em!" snarled Mardue, the oldest man present.

"The damned young upstarts!" snapped Harlihan, airways minister.

There was a muttering among the older men that would have been good to hear if Kathleen hadn't been so acutely aware of the sordid mind churning that accompanied the low clamor. Hatred was there, and ugly fear, and doubt and arrogance, frustration and determination—all were there, a deadly tangle of mental squalor.

The faintest bit pale, John Petty faced that muttering; but Kier Gray leaped to his feet, eyes blazing, fists clenched: "Sit down, you unutterable fool! How dared you precipitate this crisis now, when we may have to change our entire slan policy? We're losing, do you hear? We

haven't got a scientist to match the superscientists of the slans. What wouldn't I give to have one of them on our side! To have, say, a slan like Peter Cross, who was stupidly murdered three years ago because the police who caught him were tainted by the mentality of the mob.

"Yes, I said mob. That's all people are these days—a horrible, hopeless mob, a veritable beast we've helped build up with our propaganda. They're afraid, mortally afraid for their babies; and we haven't got a scientist who can think objectively on the matter—in fact, we haven't got a scientist worthy of the name. What incentive is there for a human being to spend a lifetime in research when in his mind is the deadening knowledge that all the discoveries he can hope to make have long since been perfected by the slans—that they're waiting out there somewhere in secret caves, or written out on paper, ready for the day when the slans make their next attempt to take over the world?

"Our science is a wreck, our education a mass of lies; and every year the wreck of human aspirations and human hopes piles higher around us. Every year there's greater dislocation, more poverty, more misery. Nothing is left to us but hatred; and hatred isn't enough. We've either got to terminate the slans or make terms with them and end this madness."

KIER GRAY's face was dark with the passion he had put into his words. And all the time, Kathleen saw, his mind was calm, watchful, cautious. Master of demagoguery, ruler of men, when he spoke again, his voice seemed flat in comparison, his magnificent baritone clear and soft:

"John Petty has accused me of wanting to keep this child alive. I want you all to think back over the past few months. Has Petty at any time ever remarked to you, laughingly, perhaps, that I intended to keep her alive? I know that he has, because it came to my ears. But you see what he's been doing, subtly spreading the poison. Your political minds will tell you that he has forced me into this position: By killing her, I will seem to have yielded, and thereby will lose prestige.

"Therefore I intend to issue a statement saying that Kathleen Layton will not be executed. In view of our lack of knowledge of slans, she will be kept alive as a study subject. I personally am determined to make the best of her continued presence by observing the development of a slan to maturity; I have already made a tremendous body of notes on the subject."

John Petty was on his feet. "Don't try to shout me down!" he snarled. "You've gone too far. Next thing you'll be handing over to the slans a continent on which they can develop these so-called superinventions of which we have heard so much but never seen. As for Kathleen Layton—by Heaven, you'll keep her alive over my dead body! The slan women are the most dangerous of all. They're the breeders, and they know their job, damn them—"

The words blurred for Kathleen. Into her mind, for the second time, had come an insistent question from Kier Gray: "How many present are for me unconditionally? Use your fingers to indicate."

One startled look she sent him, and then her mind skewered into the welter of emotions and thoughts that flooded from the men. It was

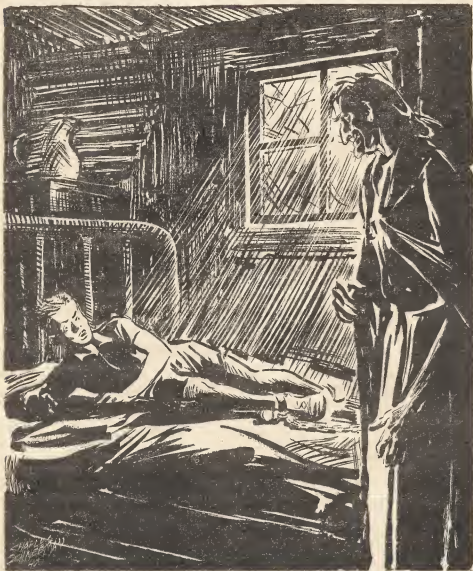
hard, for there were too many thoughts, too much interference; and besides, her brain began to weaken as she saw the truth.

Somehow she had believed the older men were all for the leader. And they weren't. In their minds was fear, a growing conviction that

Kier Gray's days were numbered, and they had better play along with the young, strong group.

-At last, utterly dismayed, she casually held three fingers up. Three out of ten in favor, four definitely against, three wavering.

She couldn't give him those last



"Turn you in for the reward? Heh!. Granny's got you, and a slan's worth more than that to Granny!"

two figures because his mind didn't ask for anything more. His whole brain was concentrated on her three fingers, his eyes the faintest bit wide and alarmed. For the barest moment it seemed to her that anxiety flickered through his thoughts.

And then the impassivity closed over his mind and countenance. He sat in his chair, like a figure of stone, cold and grim and deadly.

SHE COULDN'T take her eyes off the leader now. The strained realization came that here was a cornered man, racking his brain, searching back into his experience for a technique to turn the imminent defeat into a crushing victory. She struggled almost desperately to penetrate that icy brain, but his iron grip on his thoughts, the very lucid, straightforward motion of his mind, remained an unshakable barrier between them.

But in those surface thoughts she read his doubts, a queer uncertainty that yet held within it no fear, simply hesitation as to what he should do, *could* do next. That meant he had not really foreseen a crisis of such proportions, an organized opposition, a smoldering hatred of himself waiting only the opportunity to overthrow and destroy him. Her thought ended as John Petty spoke:

"I think we ought to take a vote on this matter now."

Kier Gray began to laugh—a long, deep, cynical laugh that ended on a note of surprisingly good humor: "So you'd like a vote on an issue that a moment ago you said I hadn't even proved to be existent! Naturally, I refuse to appeal to the reason of those present any longer—the time for reason has passed when deaf ears are turned—but just for the sake of the record, a demand

for a vote at this time is an implicit admission of guilt become openly arrogant, the result, no doubt, of the security engendered by the support of at least five, possibly more, of the council. Let me put one more of my cards on the table. I have known of this rebellion for some time and have prepared for it."

"Bah!" snapped Petty. "You're bluffing. I've watched your every move. When we first organized this council we feared eventualities such as one man dispensing with the votes of the others, and the safeguards then set up are still in force. Each of us has a private army. My own guards are out there, patrolling the corridor, and so are the guards of every member of the council, ready to rush at each other's throats when the word is given. We are quite prepared to give it and take our chance of being killed in the battle that results."

"Ah," said Kier Gray softly, "now we're out in the open."

There was a shuffling of feet among the men, a chilling spray of thoughts; and then, to Kathleen's dismay, Mardue, one of the three she had thought in unconditional support of Kier Gray, cleared his throat. She caught the thought of his weakening resolve before he spoke:

"Really, Kier, you're making a mistake in regarding yourself as dictator. You're only elected by the council; and we have a perfect right to elect someone in your place—someone, perhaps, who will be more successful in organizing the extermination of the slan."

It was turn-coating with a vengeance; the rats were deserting the sinking ship and trying desperately now, Kathleen saw, to convince the new powers that their support was valuable.

In Hallihorn's brain, too, the wind of thought was blowing in a new direction: "Yes, yes. Your talk about making a deal with the slans is treason—pure treason. That's the one untouchable subject so far as the mo . . . the people are concerned. We must do something to exterminate the slans, and perhaps a more aggressive policy on the part of a more aggressive man—"

KIER GRAY smiled wryly; and still that uncertainty was in his brain—what to do, what to do? There was a vague suggestion of something else, a tensing to the situation, a darkening resolution to take a desperate chance. But nothing tangible, nothing clear, nothing *real* came to Kathleen.

"So," Kier Gray said, still in his soft voice, "you would turn the chairmanship of this council over to a man who, a few days ago, allowed Jommy Cross, nine years old, probably the most dangerous slan alive today, to escape in his secret police car."

"At least," cried John Petty in a stung voice, "there's one slan who won't escape." He stared malevolently at Kathleen, then turned triumphantly toward the others. "Here's what we can do—execute her tomorrow; in fact, right now; and issue a statement that Kier Gray was removed from office because he had come to a secret agreement with the slans; and his refusal to kill Kathleen Layton was proof of it."

It was the strangest thing in the world to be sitting there, listening to that death sentence and feeling no emotion, as if it wasn't herself they were talking about. Her mind seemed far away, detached, and the murmur of agreement that rose up

from the men also had that odd distortion of distance.

The smile faded from Kier Gray's face: "Kathleen," he said aloud, sharply, "we might as well stop playing. How many are against me?"

She stared at him blurrily and heard herself replying tearfully: "They're all against you. They've always hated you because you're so much smarter than they are, and because they think you've kept them down and overshadowed them, and it made it seem as if they're not important."

"So he uses her to spy on us," John Petty snarled, but there was triumph in his rage. "Well, at least it's pleasant to know that we're all agreed on one thing: that Kier Gray is through."

"Not all," said Kier Gray mildly. "I disagree so violently that the eleven of you will face firing squads within ten minutes. I was undecided on such drastic action, but now there is absolutely no alternative and no going back because I have just taken an irrevocable action. I have pressed a button advising the eleven officers in command of your guard, your most trusted advisors, *and your heirs*, that the hour has come."

They stared at him stupidly, and there was a blur of thought that clambered into Kathleen's bewildered brain. It didn't make sense, what he was saying:

"You see, gentlemen, you failed to allow for a fatal flaw in human nature; the desire on the part of underlings for power is as great as your own. The solution to such a situation as came up today was suggested to me one day when Mr. Petty's chief aid approached me with the offer that he would always be willing to replace Mr. Petty. I made it

a definite policy then to explore the matter further, with very satisfying results, and saw to it that the men were on the scene for Kathleen's eleventh birth—ah, here are the new councilors!"

THE DOOR burst open, and eleven grim young men with drawn revolvers came in. What happened then happened too swiftly for thought. There was a great shout from John Petty: "Your guns!" And the wailing cry of one man, "I didn't bring one!" And then the crash of revolver shots filled the room with an echoing, re-echoing roar.

It was horrible to see the men on the floor, writhing, choking in their own blood. Through a blur, she saw one of the eleven councilors still standing, smoking gun in hand, and recognized John Petty. Abruptly, then, Kathleen's brain cleared, and she understood what had happened.

John Petty had fired first. The man who had thought to replace him was dead, a motionless figure on the floor. Grim and pale, the chief of the secret police held his gun steady as a rock, pointed at Kier Gray.

"I'll kill you," he said, "before they can get me, unless you make a deal. I'll play ball, naturally, now that you've turned the table so neatly."

"Shall we let him have it, sir?" asked the leader of the ten officers, a lean, dark man with an aquiline face, and a clipped baritone voice, whose name, Kathleen saw, was Jem Lorry. It was hard to read his mind because he, too, had a power of control over himself that defied penetration, but there was enough of his character in his surface thoughts to show him for what he was, a hard, ambitious man, utterly ruthless.

"No," Kier Gray replied thoughtfully, "John Petty will be useful. He'll have to agree that the other men were executed as a result of the investigations of his secret police disclosing secret arrangements with the slant. That will be the explanation—it always works on the poor, bewildered mass of fools outside. We owe the idea to Mr. Petty himself, but I think we were capable of thinking of it ourselves. However, his influence will be valuable in putting it over. In fact," he mused cynically, "I believe the best method is to give Petty credit for the executions; that is, he was so horrified at his discoveries of their perfidy he acted on his own initiative, and then threw himself on my mercy, which, in view of the serious evidence he produced, I naturally granted at once. How's that?"

Jem Lorry came forward. "Good stuff, sir. And now there's one thing I'd like to make clear, and I speak for all the new councilors. We need you, your terrific reputation, your brains, and we're willing to help make you a god to the people—in other words, to help consolidate your position beyond assailable—but don't think you can make arrangements with our chief officers to kill us. That won't work again."

Kier Gray said coldly: "It's hardly necessary to tell me anything so obvious. Clear this carrion out, and then—we've got some planning to do. As for you, Kathleen, go to bed. You're in the way now."

As she hurried off, shaking now from intense reaction, Kathleen wondered: In the way? Did he just mean— Or did he mean—

After the ruthless murders she had just witnessed, she couldn't be sure of him, of anything. It was a long, long time before sleep came to her weary brain and body.

IV.

For Jommy Cross there were long spells of utter darkness and mental blankness that merged finally into a steely gray light through which vague thoughts at last wove a web of reality. He opened his eyes, conscious that he was still very weak.

He was lying in a grim little room, staring up at a smeared, dirty ceiling, from which some of the plaster had fallen. The walls were an uneven gray, queerly, obscenely splotted with age. The pane of the single window was cracked and discolored; the light that forced through it fell across the end of the iron bedstead in a little dirty pool and lay there as if exhausted from the effort.

There was enough strength in its wan brightness to reveal bedclothes that were ragged remnants of what had once been gray blankets. At one edge, straw stuck out from the old torn mattress, and the whole thing stank with a stale, unaired odor so horrible that his mind cringed as from a physical blow.

Sick though he still was, he flung the foul blankets from him, and started to slip out of bed. A chain rattled menacingly, and there was sudden pain in his right ankle. He lay back, exhausted by his brief effort, and stunned. He was chained to this loathsome bed!

Heavy footsteps aroused him from the stupor into which he had fallen; he opened his eyes to see a tall, gaunt woman in a formless gray dress standing at the door, her black eyes gleaming down at him like bright beads.

"Ah," she croaked. "Granny's new boarder has come out of his fever, and now we can get acquainted. That's good! That's good!"

She rubbed her dry hands together raspingly. "We're going to get along beautifully, aren't we? But you've got to earn your keep. No slackers can leech off Granny. No, sir. We'll have a heart-to-heart talk about that. Yes, yes," she leered at him over clasped hands, "a heart-to-heart talk."

Jommy stared up at the old woman in repelled fascination. As the thin, long, slightly stooped creature sank with a grunt onto the foot of the bed, he drew his legs up against his body, withdrawing as far from her as the chain would allow.

It struck him that he had never seen a face that more nearly expressed the malignant character behind the mask of old flesh. With rising disgust, he compared her thin, lined, egg-shaped head with the mind inside; and it was all there. Every twisted line in that wrecked face had its counterpart in the twisted brain. A whole world of lechery dwelt within the confines of that shrewd and putrid mind.

His thought must have shown in his face, for she snarled with sudden savagery: "Yes, yes, to look at Granny, you'd never think she was once a famous beauty. You'd never suspect that men once worshiped the white loveliness of her. But don't forget that this old hag saved your life. Never forget that, or Granny may turn your ungrateful hide over to the police. And how they'd love to have you. How they would love it! But Granny's kind to them as is kind to her and does as she wants."

Granny! Was there ever a term of affection more prostituted than this old woman calling herself Granny! It outraged all sense of decency even to think of this creature as—human!

He searched her mind, trying to find in its depths her real name.

But there was only a blur of mind pictures of a silly, stage-struck girl, profligate with her charms, ruined, degraded to the level of the street, hardened and destroyed by adversity. Her identity was buried in a cesspool of the evil she had done and thought. There was an endless story of thieving, there was the dark and horrible kaleidoscope of more loathsome crimes, there was murder committed—

SHUDDERING, immeasurably weary now that the first stimulus of her presence was fading, Jommy withdrew from the unclean nightmare, the utter abomination that was Granny's mind. The old wretch leaned toward him, her eyes like gimlets drilling into his:

"It's true," she hissed, "that slans can read minds?"

"Yes," Jommy admitted, "and I can see what you're thinking, but it's no use."

She chuckled grimly. "Then you don't read all that's in old Granny's mind. Granny's no fool; Granny's smart; and she knows better than to think she can force a slan to stay and work for her. He has to be free for what she wants him to do. He's got to see that, being a slan, this will be the safest place for him until he grows up. Now, isn't that clever; isn't Granny clever?"

Jommy sighed sleepily. "I can see what's in your mind; but I can't talk to you now. When we slans are sick—and that's not often—we just sleep and sleep. My waking up the way I did means that my subconscious was worried, and forced me awake because it thought I was in danger. We slans have a lot of protections like that. But now I've got to go back to sleep and get well."

The coal-black eyes grew wide. The lustful mind recoiled, briefly accepting defeat in its main purpose of making immediate wealth from its prey. Greed yielded momentarily to violent curiosity, but there was no intention of letting him sleep. She shrilled in a hoarse whisper:

"Is it true that slans make monsters out of human beings?"

A red needle of fury poked through Jommy's brain. Weariness fell away from him. He sat up, exploding in rage:

"That's a lie! It's one of those horrible lies that human beings tell about us to make us seem inhuman, to make everybody hate us, kill us. It—"

He sank back, exhausted, rage evaporating. "My mother and father were the dearest people alive," he said softly, "and they were terribly unhappy. They met on the street one day, saw in each other's minds that they were slans; until then they'd lived the loneliest of lives; and they never harmed anyone. It's the human beings who are the criminals. Dad didn't fight as hard as he could have when they cornered him and shot him in the back. He could have fought; he should have! Because he had the most terrible weapon the world has ever seen—so terrible he wouldn't even carry it with him for fear he might use it. When I'm fifteen I'm supposed to—"

He stopped, utterly appalled at his indiscretion. For an instant he felt so sick, so immeasurably weary, that his mind simply refused to hold the burden of his thought. He knew only that he had given away the greatest secret in slan history, and if this grasping old wretch turned him over to the police in his present weakened condition, all was lost.

SLOWLY he breathed easier. He saw that her mind hadn't really caught the enormous implication of his revelation. That she hadn't really heard him at the moment when he mentioned the weapon—for that rapacious brain had already been too long away from its main purpose. And now, like a vulture, it swooped down on prey it knew to be exhausted.

"Granny's glad to know that Jommy's such a nice boy. Poor, starving old Granny needs a young slan to make money for her and him. You won't mind working for tired old Granny, will you?" Her voice hardened. "Beggars can't be choosers, you know."

The knowledge that his secret was safe acted like a drug. His eyelids drooped. He said: "Really, I can't talk to you now. I've got to sleep before—"

He saw dully that she wasn't going to let him go; her cunning mind had already realized what could agitate him. She said sharply, not because she was interested now, but to keep him awake:

"What is a slan? What makes you different? Where did slans come from in the first place? They were made, weren't they—like machines?"

Funny how that could bring a surge of responsive anger when his mind saw that that was her purpose. Dimly he realized that bodily weakness had taken normal restraints from his mind. He said in a dull rage:

"That's another one of the lies. I was born just like anyone else. So were my parents. Beyond that, I don't know."

"Your parents must have known!" the old woman prodded him.

Jommy shook his head; his eyes closed. "No. Mother said dad was

always too busy to investigate the mystery of the slans. But now, leave me alone. I know what you're trying to do and I know what you want, but it's dishonest and I won't do it."

"That's stupid," the old woman snapped angrily, on her subject at last. "Is it dishonest to rob people who live by robbery and cheating? Shall you and Granny eat crusts of bread when the world is so rich that every treasury bulges with gold, every granary bulges with wheat, and honey flows in the streets? Bah on your honesty, that's what Granny says. How can a slan, hunted like a rat, talk of being honest?"

Jommy was silent, and not only because of his unutterable need for sleep. He had had thoughts like that himself. The old woman pounded on:

"Where will you go? What will you do? Will you live in the streets? What about winter? Where in all this world can a little slan boy go?"

Her voice sank, in a repulsive attempt at sympathy: "Your poor, dear mother would have wanted you to do what I'm asking. She had no love for human beings. I've saved the paper to show you how they shot her down like a dog when she tried to escape. Would you like to see it?"

"No!" said Jommy, but his mind whirled with strange dizziness.

The harsh voice pressed on: "Don't you want to do everything you can against a world that's so cruel? Make them pay; make them regret what they've done? You're not afraid?"

He was silent, his brain seething. The old woman's voice took on a cunning whine. "Life's too hard for old Granny—too hard. If you won't help Granny, she'll have to go on doing other things—you saw in her

mind about them. But she promises not to do that any more if you'll help her. Think of that. She'll stop all the wicked things she's had to do for a living in this cold, cruel world."

Jommy felt beaten. His brain seemed fagged by the harsh tussle, and by the dragging weight of his dully aching body. He gritted: "You're a rotten, miserable old scoundrel, and some day I'll kill you!"

"Then you'll stay until that 'some day'!" Granny cackled triumphantly. Her horrible, wrinkled hands rubbed together like two dry-scaled snakes crawling over each other raspingly. "And you'll do as Granny says, too, or she'll turn you over to the police so fast— Welcome to our little home, Jommy. Welcome. You'll be better the next time you waken, Granny hopes."

"Yes," Jommy said weakly. "I'll be better."

He slept.

THREE DAYS later, Jommy followed the old woman through the kitchen toward the back door. The kitchen was an ugly, bare little room, and Jommy closed his eyes to shut out the dirt and untidiness that were everywhere. He thought: The old woman was right. Horrible as the life promised to be, this little shack, sunk here in the oblivion of utter poverty, would make an ideal hiding place for a little slant boy who had to wait at least six years before he could visit the hiding place of his father's secrets; who had to grow up before he could hope to carry out the great things that had to be done.

The thought fled as the door opened and he saw what lay beyond. He stopped short, stunned by the vista that opened up before him.

Never in all the world had he expected to see anything like *this*.

First was the ugly little yard, piled with old metal and junk of every description—a yard barren of grass or trees, without beauty; a discordant, jangling, horrible stretch of sterility inclosed by a rusting, twisted fence of rotten wood and wire.

A small ramshackle barn tottered precariously at the farthest end of the yard. The blurred mind pictures of a horse came from inside. The horse itself was vaguely visible through the open door.

But Jommy's eyes flashed past the yard. His passing glance picked up the unpleasant details; that was all. His mind, his vision, reached beyond the fence, beyond that rickety barn.

Beyond there were trees, little bunches of them; and grass—a green, pleasant meadow that sloped toward a broad river, gleaming dully now that the rays of the sun no longer touched it with their shining fire.

But even the meadow—part of a golf course, he noted absently—held his gaze for an instant only. An incredible land of dreams began on the opposite shore of the river; a veritable fairyland of growth, a gardener's paradise. Because of some trees that blocked his vision, he could see only a narrow stretch of that gemlike Eden, with its sparkling fountains and its square mile on square mile of flowers and terraces and overwhelming beauty. But that narrow, visible area contained a white, dazzling pathway.

A PATHWAY! Jommy's mind soared. Unutterable emotion choked his throat. The path was visible, running in a geometrically straight line away from his gaze. It ran into

the dim distance, a gleaming white ribbon that faded into the mist of miles.

And it was there, at the ultimate limit of his vision, far beyond the normal horizon, that he saw the palace.

Only part of the base of that tremendous, that incredible structure, reached up from the other side of the skyline. A thousand feet then it reared—and merged into a tower that soared another five hundred feet into the heavens. Stupendous tower! Half a thousand feet of jewellike lacework that seemed almost fragile, sparkling there with all the colors of the rainbow, a translucent, shining, fantastic thing, built in the noble style of the old days; not merely ornamented—in its very design, its fine-wrought magnificence, it was ornament in itself.

Here in this glory of architectural triumph the slans had created their masterpiece, only to have it fall to the victors after the war of disaster.

It was too beautiful; it hurt his eyes, hurt his mind with the thoughts that it brought. To think that he had lived nine years in this city and had never before seen this glorious achievement of his race!

His mother's reasons for not showing it to him seemed somehow utterly mistaken, now that he had the reality before him. "It'll make you bitter, Jommy, to realize that the palace of the slans now belongs to Kier Gray and his ghoulish crew. Besides, there are special precautions against us at that end of the city. You'll see it soon enough."

But it wasn't soon enough. The sense of something missed burned bright and painful. It would have given him courage in his blacker moments to know of this noble monument to his people.

His mother had said: "Human

beings will never know all the secrets of that building. There are mysteries there, forgotten rooms and passages, hidden wonders that even the slans no longer know about, except in a vague way. Kier Gray doesn't realize it, but all the weapons and machines the human beings have searched for so desperately are buried right in that building—"

A harsh voice jarred his ears. Jommy tore his gaze reluctantly from the grandeur across the river and became aware of Granny. He saw she had hitched the old horse to her junk wagon.

"Quit your daydreaming," she commanded. "And don't get any funny ideas into your head. The palace and palace grounds are not for slans. And now—get in under these blankets, and mind you keep still. There's a busybody policeman up the street who'd better not find out about you. We've got to hurry."

Jommy's eyes turned to the palace for one last lingering look. So that palace wasn't for slans! He felt a queer thrill. Some day he'd go over there to look for Kier Gray. And when that day came— The thought stopped as he realized he was shaking in every nerve from sheer, unadulterated rage and hatred against the men who had murdered his mother and father.

V.

THE rickety old cart was nearer downtown now; it rattled and shook over the uneven pavement of the back alleys until Jommy, half lying, half crouching in the back, felt as if his brains would shake out of his head. Twice he made a painful attempt to stand up, but each time the old woman snarled at him.

"You stay down! Granny doesn't want anyone to see those good

clothes of yours. You just keep covered up with that robe."

The tattered old robe stank of old Bill, the horse; the stench was so strong and so rancid in Jommy's nostrils that little shivers of nausea ran through him. At long last the junk wagon stopped.

"Get out," snapped Granny, "and go into that department store. You'll find big pockets I've sewn inside your coat. Just fill them with stuff so they won't bulge."

Dizzily, Jommy clambered down to the cement. He stood there swaying, waiting for the swift flame of his strength to drive away that unnatural weakness. He said then: "I'll be back in about half an hour."

The dark, rapacious face bent toward him, the black eyes glittered: "And don't get caught, and use your common sense in what you take."

"You needn't worry," Jommy replied confidently. "Before I take anything I'll throw my mind around to see if anyone is looking. It's as simple as that."

"Good!" The thin scab of a face broke into a hideous grin. "And don't worry if Granny isn't here when you come back. She's going over to the liquor store for some medicine. She can afford medicine now that she's got a young slant; and she does need it—oh, so much—to warm her cold old bones. Yes, Granny must lay in a good supply of medicine."

Outside fear came rushing into him as he breasted the throngs that washed in and out of the skyscraper department store; abnormal, exaggerated fear. He opened his mind wide, and for one long moment kept it that way. Excitement, tenseness, dismay and uncertainty—an enormous, dark spray of fear caught at him and twisted his mind along into

the swirling, black stream of it. Shuddering, he pulled himself clear.

But during that brief plunge he had caught the basis of that mass fear. Executions at the palace! John Petty, the head of the secret police, had caught ten councilors making a deal with the slants, and killed them. The crowd didn't quite believe; they were afraid of John Petty, they distrusted him. Thank Heaven Kier Gray was there, solid as a rock to protect the world from the slants—and from the sinister John Petty.

It was worse inside the store. There were more people. Their thoughts pounded at his brain, a mad chaos of them, as he threaded his way along the aisles of shining floor displays, under the gleaming whiteness of the ceiling lights. A gorgeous world of goods in enormous quantities swelled all around him—and taking what he wanted proved easier than he had expected.

He passed the end of the long, glittering jewelry department and helped himself to a pendant marked fifty-five dollars. His impulse was to enter the department, but he caught the thought of the salesgirl. Annoyance was in her mind, hostility at the idea of a small boy going into the jewelry section. Children were not welcome in that world of munificent gems and fine metals.

JOMMY turned away, brushing past a tall, good-looking man who whisked by without so much as a glance at him.

Jommy walked on for a few paces—and stopped. A shock such as he had never known before in his life stabbed through him. It was like a knife cutting into his brain, so sharp it was; and yet it was not unpleasant. Astonishment, joy, amazement flashed through him as he

turned and stared eagerly after the back of the retreating man.

The handsome, powerfully built stranger was a slan—a full-grown slan!

The thing was so tremendous, so incredibly important, that after the first terrific realization sank in, his brain reeled. The basic calm of his slan-steady mind was not shattered—nor was there the sinking into emotionalism that he had noticed when he was sick. But his brain soared with a sheer, wild eagerness, unlike anything he had ever known.

He began to walk rapidly after the man. His thought reached out, seeking swift contact with the other's brain—recoiled!

Jommy frowned. He could still see that the being was a slan, but his mind could not reach beyond the surface of the slan's mind. And that surface reflected no awareness of Jommy, not the faintest suggestion that he was conscious of any outside thoughts at all.

There was mystery here. It had been impossible a few days before to read beyond the surface of John Petty's mind. Yet there had never been any question of Petty being anything but a human being.

It was impossible to explain the difference to himself. Except that when his mother guarded her thoughts from intrusion, he had always been able to make her aware with a directed vibration. That had been his experience, too.

The conclusion was staggering. It meant—here was a slan who couldn't read minds, yet guarded his own brain from being read.

Guarded it from whom? From other slans? And what manner of a slan was it that couldn't read minds?

They were out in the street now;

and it would have been easy there under the brilliant lights that blazed from the street lamps, to break into a run that would have brought him up to the slan in a few moments. In all those rushing, selfish crowds, who would notice a little boy running?

But instead of narrowing the gap that separated him from the slan, he allowed it to widen. The entire logical roots of his existence were threatened by the amazing situation presented by this slan; and the whole hypnotic education that his father had imprinted upon his young mind rose up and prevented precipitate action.

Two blocks from the store, the slan turned up a wide side street; and puzzled, Jommy followed him at a safe distance—puzzled because he knew this was something of a dead-end street, not a residential section. One, two, three blocks they went; and then he was certain.

Quite incredibly, the slan was heading for the air center that, with all its buildings and factories and landing field, sprawled for a square mile at this part of the city. The thing was impossible. Why, people couldn't even get near an airplane without having to remove their hats to prove that they were minus slan tendrils.

The slan headed straight toward a big, blazing sign: AIR CENTER—vanished without hesitation into the revolving door under the sign.

Almost sick with doubt, Jommy paused at the door. *The Air Center, that dominated the entire aircraft industry on the face of the globe!* Was it possible that slans worked here? That in the very center of the human world that hated them with almost unimaginable

ferocity slans actually controlled the greatest transportation system in the entire world?

Utterly impossible! Completely, insanely incredible. But—that slan!

He pushed through the door, and along the corridor of marble that stretched ahead of him, countless doors leading off it. For the moment there was not a person in sight, but little thoughts trickled out to feed his growing amazement and delight.

The place swarmed with slans. There must be scores, *hundreds!*

Just ahead of him, a door opened, and two bareheaded young men came out and walked toward him. They were talking quietly to each other, and for a moment did not see him.

He had time to catch their surface thoughts, the calm and magnificent confidence of them, the utter lack of fear. Two slans, in the very prime of maturity—and bareheaded!

Bareheaded. That was what finally penetrated to Jommy above everything else. Bareheaded—and without tendrils.

For a moment it seemed to him that his eyes must be playing him tricks. His gaze searched almost frantically for the golden strands of tendril that should have been there.

Tendriless slans! So that was it! That, explained why they couldn't read minds. That—

The men were only ten feet away from him, and simultaneously, they

became aware of him. They stopped.

"Boy!" said one, "you'll have to get out. Children are not allowed here. Run along now."

Jommy drew a deep breath. The mildness of the reproof was reassuring, especially now that the mystery was explained. It was wonderful, that by the simple removal of their telltale tendrils, they could live and work securely in the very center of their enemies!

With a sweeping, almost melodramatic gesture, he reached up to his cap, and removed it.

"It's all right," he began. "I'm—"

The words blurred on his lips, and sharp dismay stabbed through him. He watched the two men with fear-widened eyes. For after one uncontrolled moment of surprise, the mind shields of the two men closed tight, their smiles friendly.

One said, "Well, this is a surprise!"

And the other echoed: "A damned pleasant surprise. Welcome, kid!"

But Jommy was not listening. His whole mind was swaying from the shock of the thoughts that had exploded in the brains of the two men in that brief moment when they saw the glitteringly golden tendrils in his hair:

"God!" the first one thought; "it's a damned snake!"

And from the other came a thought utterly cold, utterly merciless: "Kill the damned thing!"

TO BE CONTINUED.



UNIVERSES FOR LENSES

By R. S. Richardson

A Mt. Wilson astronomer tells of a program of research now under way embracing an idea so fantastic, so immense in its scope, that not even the wildest science-fictionists thought up this one! That title is meant literally!

ONE of the favorite dreams of the science-fiction fan is that some day, somehow, we will be able to get a peek at the Great Unknown. To travel in time, or see the world of four dimensions, if only for a single hour.

Today astronomers are hot on the trail of an effect that promises to give them a glimpse into depths of space far beyond the range of any telescope we can hope to build at present. This is not merely the idle notion of some "desk astronomer," playing with eigen-functions or tensors. It is the result of a new application of what has been called a fourth test of Einstein's general theory of relativity.

It will be recalled that Einstein originally gave three ways of comparing his theory with observation: these were the advance in the perihelion of Mercury's orbit, the deflection of light at the Sun's limb, and the shift of spectral lines toward the red. The fact that his theory was capable of being verified at all was what really made Einstein's name known to that lowly creature, the Man in the Street. If he had simply created a fantastic universe in which space and time are warped and left it in flatland between the dusty pages of the "Annalen der Physik," probably no one ever would have heard of it except for a few mathe-

matical physicists. But instead he seemed anxious to thrust it into the hard light of day, challenging the scientific world with statements such as, "It would be a most desirable thing if astronomers would take up the questions here raised." It was that sort of thing that got people. For they began to wonder, "My God! Do you suppose it's *really* true?"

The task of finding out was not an easy one. The best things in life may be free, but the juiciest plums in physical science always seem to be just a little beyond our reach. By 1929, however, most of the evidence was in and found to be generally favorable to Einstein. The long-unexplained difference between the observed and calculated advance in the perihelion of Mercury's orbit was removed by the refinements of relativity. The Lick Observatory eclipse expedition to Australia in 1922 had resulted in the detection of the bending of light rays near the Sun by precisely the amount predicted. And the shift of spectral lines toward the red had been measured in the Sun by St. John at Mount Wilson, and in the companion of Sirius by Adams at Mount Wilson and Moore at Lick. Three effects, widely different in type, yet all included in a single comprehensive theory. To those

who still clung to Euclid and Newton the relativitists put it this way: "Here are three facts of observation. Now, regardless of whether you accept Einstein's theory or not, suppose that *you* explain them."

While the right-wingers had no answer ready for this one, it is true that all was not so smooth as the surface indicated. An attorney thoroughly familiar with every detail of the original observations should have had no trouble in raising at least a reasonable doubt in the minds of a slightly bewildered lay jury. For it must be admitted that sufficient damaging evidence exists to give the prosecution a most formidable case.

TAKE the over-rapid advance in the perihelion of Mercury's orbit, apparently a triumph for relativity. This had gone unexplained since the time of Le Verrier, despite efforts to patch up the law of gravitation and the aid of the planet Vulcan. But one must always remember that the law of gravitation had been questioned many times in the past, and the trouble invariably found to be either in the mathematics or the observations. Also that the theory of planetary perturbations is enormously intricate, and many problems still remain unsolved. Surely no one could maintain that the last word has been said on the subject. Simon Newcomb, probably the greatest authority on celestial mechanics the United States has had, devoted his life to the stupendous task of a general solution of motions within the Solar System. Yet at the close of his last work he concluded, rather pathetically, "It is therefore necessary . . . that the secular motions of the elements be completely rediscussed."

The deflection of light at the Sun's

limb, the most spectacular test, involves the comparison of two photographs: one taken during the eclipse showing the star field around the Sun, and another taken at night of the same stars unaffected by the Sun. This necessarily means that the two must be exposed under different conditions of temperature, humidity, and refraction—quantities that can hardly help but introduce some uncertainty into the positions of the star images. For example, the Lick expedition of 1922 took the night photographs in May at Tahiti. Then the instruments were torn down and shipped to Wallal, Australia, where the eclipse photographs were taken in September. How can we be sure that no systematic error was produced by the shaking up the lenses and cameras must have gotten during the trip?

As for the shift of spectral lines toward the red, it is true that observations are in agreement with relativity at the Sun's limb. But the agreement immediately disappears when observations are made all the way across the Sun, from center to limb. And the measurement of the spectral lines in the companion of Sirius is notoriously difficult, owing to their haziness and the glare from Sirius nearby.

Thus it is apparent that the observational basis for the general theory of relativity rests upon measurements of the most exacting kind, made by a few individuals, often working under highly unfavorable circumstances.

The extreme difficulty of detecting these effects has naturally caused scientists to do considerable head-scratching trying to think up some others. What is needed is one so spectacular in character that it would immediately dispose of all ob-

jections for all time. This has led to the question: given certain ideal conditions, does any case arise in nature where the effects of relativity are visible on a grand scale? Like a rainbow after a storm, for example. The answer is "Yes"—but it is not for the eyes of Earthbound creatures on this little globe.

Readers of science-fiction, however, possess certain peculiar advantages over the rest of mankind. For they are *not* Earthbound. On the contrary they are free to shake off the bondage of gravitation any time they please. So let us delay no longer in fitting out a spaceship with which we can scour the Universe for the perfect set-up the relativitists need.

WE SHALL be on the lookout for a particular type of double star. The components of this binary system must satisfy very special conditions. One should be an intensely luminous body, such as an MO-type supergiant. The other component should be of just the opposite type, a star of moderate mass with very small radius. Now there is one class of stars that combines these properties perfectly—the white dwarfs. Without question they are among the most astounding things the telescope has revealed; they represent matter in its weirdest state. For instead of being huge balls of fire as stars should be, they are tiny objects no bigger than planets. But into their tiny volumes may be crammed several times as much stuff as the Sun contains. This makes the white dwarfs inconceivably dense. Without cracking a smile, physicists call such matter *degenerate*, a term referring to a depraved condition of the atom in which only the lowest quantum states are occupied. With the electrons down as close to

the nucleus as possible, a great many atoms can be crowded into an exceedingly small space, making the density correspondingly high.

The wildest white dwarf found so far goes under its catalogue name of A. C. + 70° 8247. Estimates that should be somewhere near the truth give it a mass of *2.8 suns* and a radius of *2,000 miles*.* This makes its density 36,000,000 times that of water or 620 tons per cubic inch. The surface gravity is 3,400,000 times the pull we experience here on Earth. A man subject to this force would be immediately flattened out thinner than this sheet of paper. Even an ant would be crushed under its own weight.

Now a highly compressed star of this kind not only exerts a terrific force on its surface, but also powerfully distorts the space around it. The result is that a light beam grazing the star will be deflected from its straight-line path, owing to the non-Euclidean character of time and space in this region. For an ordinary dwarf star like the Sun the deflection for a grazing ray amounts to 1.76 seconds of arc. But for A. C. + 70° 8247 it is 611 times as great, or 1,076 seconds. Thus the beam after passing the star would be surprised to find itself headed for an entirely different part of space than before, without having gone through any refracting medium.

On Earth the most we can ever see is the minute deflection of light at the Sun's limb. But by landing our spaceship on a planetoid properly oriented with respect to the double star system, we should be able to witness one of the strangest sights nature can show us—a relativistic eclipse.

*The size of the Moon—but some two and a half times as massive as the entire solar system!—Ed.

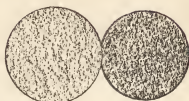
Eclipse at 17 hrs., 23 mins., 07 secs. Eclipse at 17 hrs., 24 mins., 13 secs.

GEOMETRICAL ECLIPSE

WHITE DWARF



SUPERGIANT

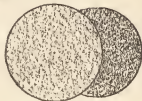


RELATIVISTIC ECLIPSE

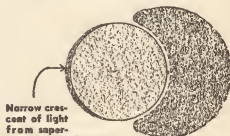


Eclipse at 17 hrs., 25 mins., 30 secs. Eclipse at 17 hrs., 25 mins., 38 secs.

GEOMETRICAL ECLIPSE



RELATIVISTIC ECLIPSE



Narrow crescent of light from supergiant deflected around on opposite side.

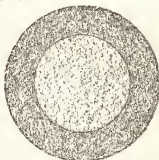
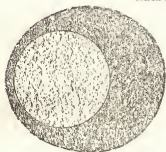
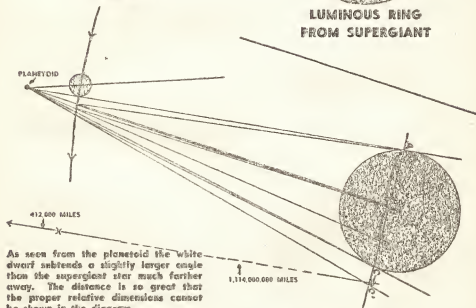
Eclipse at 17 hrs., 25 mins., 45 secs.

Eclipse at "Totality"
17 hrs., 26 mins., 47 secs.

GEOMETRICAL ECLIPSE



RELATIVISTIC ECLIPSE

LUMINOUS RING
FROM SUPERGIANT

As seen from the planetoid the white dwarf subtends a slightly larger angle than the supergiant star much farther away. The distance is so great that the proper relative dimensions cannot be shown in the diagram.

The gravitational field of the white dwarf makes the supergiant appear to shrink away from it. Thus A appears displaced to A', B a smaller distance to B', and C to C'. As a result, the supergiant is compressed into a swollen crescent-shaped figure.

TO GET the maximum effect, the supergiant M star should be far enough away so that it appears just a little smaller than the white dwarf; that is, we want the eclipse of the bright star by its faint companion to be total. Calculations show that parallel rays grazing the dwarf will converge to a focus 383,000 miles beyond it. The display will be more remarkable, however, if we anchor our spaceship a little farther out than this. Suppose we make it 412,000 miles, from which the white dwarf will present a disk about the same size as the Sun. The supergiant should be sufficiently far away to appear a bit smaller. We will remove it to a distance of 1,526,000,000 miles from the planetoid, from where it looks twenty percent smaller than the white dwarf. While we are at it, let us assume also that we are going to observe the eclipse as the dwarf rounds the periastron point of its orbit.

What will we see as the white dwarf rapidly approaches this point? Taking a reasonable value for the eccentricity of the orbit, and with the masses and distances given, an account of the first expedition to observe the phenomenon might read somewhat as follows:

17 hours, 23 min., 07 secs., G.M.T. As the disk of the white dwarf nears that of the supergiant, the latter seems to shrink away in the opposite direction. At the same time it starts to swell, and become slightly elongated. This state of affairs is shown in Fig. 1.

17 hours, 24 min., 13 secs. The deformation of the supergiant is increasing rapidly. It continues to swell and is now almost flat on the side turned toward the dwarf star. Actual calculations show, however, that geometrically the two disks are

in contact, although they seem to be about a radius apart.

17 hours, 25 min., 30 secs. The supergiant has grown into a swollen crescent-shaped figure with only a small space between its concave side and the white dwarf. In the geometrical eclipse, the supergiant is nearly half obscured.

17 hours, 25 min., 38 secs. At this moment a thin sliver of light flashes out on the side of the white dwarf opposite the supergiant. This means that the geometrical eclipse has progressed far enough for some of the rays from the supergiant to be deflected around the far side of the dwarf star.

17 hours, 25 min., 45 secs. The supergiant now entirely surrounds its faint companion with a huge bulge on the side where the crescent was. The supergiant is now more than half eclipsed.

17 hours, 26 min., 47 secs. The halo rapidly becomes more nearly symmetrical, until finally it envelops the dwarf with an even band of light at "totality." As the dwarf star moves off the eclipse is repeated in reverse order.

ONE LOOK at light rays behaving so contrary to ordinary experience should convince the most skeptical. But until someone comes along with the spaceship necessary to perform the experiment, the fourth effect seemed to be of theoretical interest only. Quite recently, however, through a rather unusual chain of events, the whole question has been opened up again. As a result, possibilities have been revealed never dreamed of by astronomers of a few decades ago. The story is an excellent example of the classic acorn-to-mighty-oak transition.

Back in the spring of 1935, Mr. Rudi Mandl of New York got a big

idea—nothing less than a new test of the theory of relativity. To him the beauty of the idea lay in its simplicity. All you had to do was look at a star through a six-inch telescope.

Mr. Mandl was not a professional scientist, although he had received training as an electrical engineer at the University of Vienna. He was a Czechoslovakian, forty-two years old, who had come to the United States after the disastrous German inflation of 1923. At the time in question, according to newspaper accounts, he was making a precarious living washing dishes in a New York restaurant. His hobby was reading about theoretical physics and adorning eggshells with curious designs.

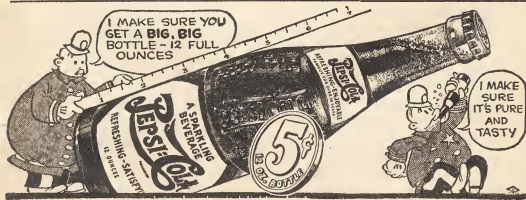
He had gotten precisely the idea of a relativistic eclipse described above, with the spaceship feature omitted. A close optical double star was to be used instead. If in the course of time their proper motions cause an eclipse, a bright ring should appear as light from the more distant star is brought into focus by the nearer one. It should be noted that the closer star must also be the fainter, as a bright star eclipsing a faint one would mask the effect.

Perhaps someone may inquire at this juncture, "Why an optical double? Wouldn't a physical double be much better? They are more numerous, and we could calculate approximately when an eclipse is due."

A physical double will not answer the purpose for the same reason that a planet cannot be used to determine the deflection of light at the Sun's limb. The planet is too near the Sun for the deflection to become perceptible. Only when there is an enormous distance between the two objects will the displacement equal the deflection.

Mr. Mandl was so enthusiastic about the possibilities of his scheme, that an interview was arranged for him with Professor Einstein. As a result of their conversation, Einstein published a brief note in *Science*, giving some calculations on the effect.

Now it would be very pleasant to record that Professor Einstein hailed Mr. Mandl's test as a discovery of the first magnitude, was overjoyed at the prospect of being able to confirm his theory at last, and there was general rejoicing on both sides. On the contrary, while speaking of the lenslike action of a star as a most curious effect, he concluded that "of course, there is no hope of observ-



ing this phenomenon directly. First, we shall scarcely ever approach closely enough to such a central line. Second, the angle beta—of the luminous circle—will defy the resolving power of our instruments . . . therefore, there is no great chance of observing this phenomenon, even if dazzling by the light of the much nearer star is disregarded."

And there the matter rested. Another good idea gone wrong! Actually it is an old one, although neither Mr. Mandl nor Professor Einstein seemed aware of the fact. To cite one example, Eddington discussed it twenty years ago in his little book, "Space, Time, and Gravitation."

But Einstein's note attracted enough attention so that other scientists began to talk the matter over and think about it. And as so often happens, the case becomes much more hopeful when tackled from an entirely new point of view.

SUPPOSE that instead of using stars for lenses, we try an object of quite another type, namely the *extragalactic nebulae*. A little consideration will show that they possess so many advantages over stars as to make the detection of effect almost a certainty. It becomes largely a question of time.

In the first place, exposures on the best nebular fields show so many images that a few must eventually overlap the still larger number of background nebulae. At least the probability is high enough so that we should not have to wait an unreasonable length of time.

Secondly, light rays grazing a massive condensed system will undergo a considerable deflection. Recent investigations of the Coma cluster have yielded masses of 10^{11} suns, a hundred times as large as the value previously accepted for

an average nebula. Using this mass, and a diameter of 4,000 light years, the deflection would be 26 seconds of arc, whereas a star would give a deflection of only a second or two.

Lastly, even very distant nebulae show a disk; they are never reduced to mere points of light like the stars. This is important because both the size and brightness of the luminous ring depend directly upon the angular diameter of the lens nebula. The most critical factor, however, is how close the Earth comes to the line extending through the two nebulae. If we should ever get exactly in line the increase in brightness would be infinite. This is expecting far too much, and about the most we can hope for is to pass within a few light seconds of it. Since the Earth's orbital velocity amounts to almost two million miles per day, it is seen that the ring will be visible for several hours or days at the most.

A strange result that comes out of the eclipse equations is that the brightness of the luminous ring not only does not decrease with increasing distance of the observer, but actually increases. That is, the ring around a nebular lens 100 million light years away would be ten times brighter than one at a distance of a million light years. Why? Because the increase in brightness varies directly as the square root of the distance. But why does it vary directly as the square root of the distance? I don't know. Those wishing to pursue the matter farther had better ask Professor Einstein about it—and don't forget to inclose a self-addressed, stamped envelope.

How much farther will the lens effect allow us to peer into space? This all depends, of course, upon the increase in the brightness of the background nebula, which, in turn,

depends upon how close the Earth comes to the central line. Let us take an extreme case which would happen very rarely, where the approach is so close that the brightness goes up 10,000 fold, corresponding to a rise of 10 magnitudes. Now the faintest nebulae we can photograph are about magnitude 21, at an average distance of the order of 500 million light years. With gravitational focusing under the most favorable conditions we should get a glimpse of nebulae down to magnitude 31. Extrapolating the distance-magnitude relation out to 31, gives a distance of 63,000 million light years. Compare this with the estimated gain of two magnitudes or so for the 200-inch over the 100-inch.

This would be getting out pretty far as universes go these days, farther, perhaps, than there is room to go. Einstein's old static universe, which cosmologists junked long ago, only had a fixed radius of about 90,000 million light years. But it did have one nice feature, that a light ray could go clear around it in some 550,000 million years. The universe proposed by de Sitter is unbounded, but is unobservable beyond a distance of 2,000 million light years. Nebulae within this region would appear to be receding, but disappear once the limit is reached.

The possibilities of the lens effect are tremendous and we can comprehend only the most obvious one at present. There are several problems to which it could be applied immediately, however. For example, if we can ever get the spectrum of light from a nebulae out of reach of our present telescopes, what would be the magnitude of the red shift? Would it show a falling off

in the rate of expansion at these vast distances, or would the nebulae still be flying outward, faster and faster, the farther they are away from us?

The lens effect offers a beautiful means of determining nebular masses, a problem in which considerable confusion exists at present. The data needed are the angle through which the light has been deflected and a fairly accurate knowledge of the distance. Once these are known the mass follows immediately. The method is unique in that it gives the mass of an individual nebula. Others give either average values or the ratios between the masses of nebulae of different types.

So far no nebular rings have been found, but then no one has made a systematic search for them as yet. But already a casual examination of old plates has revealed several objects that look suspicious. Without doubt a vast amount of work will have to be done before gravitational focusing becomes a tried and true research tool, like the Doppler effect. There will be weary hours spent at the telescope, patiently keeping crosswires centered on a guide star. Then there will be many more hours devoted to examining with a lens the hundreds of tiny specks that represent other universes than ours. And after hundreds of plates have been studied there will probably be nothing to report beyond just a line or two—"so far, results negative." But some day one of the plates will have a speck with a ring around it, the tiny halo that means light has found its way to us at last from that faraway region where "space by itself, and time by itself . . . fade away into mere shadows, and only a kind of union of the two . . . preserves an independent reality."

THE END

IN TIMES TO COME



NEXT month will, of course, carry on with "Slan," a thing to be expected perhaps, but still an item that is worth mentioning. Most serials, so to speak, merely continue to happen. This one gets faster and stronger as it goes. (We're planning to lay in extra copies of these issues in anticipation of a demand for back copies in the future.) We advise it's not one to miss now, however.

Also next month we bring "Farewell to the Master," by Harry Bates—who hasn't shown up in science-fiction for several years now. The yarn he presents will, however, show he has not lost his touch, by any means. It's largely about a robot of very curious nature, one that, when put in a museum, didn't stay there. As a matter of fact, the robot wasn't put in the museum; it was of such a size and mass it was easier to build the museum around the robot! But all was peaceful and serene—till a newsman started prying about at night, investigating the robot the scientists had been unable to activate in any way. The newsman's investigation led to—unhappy success, let's say.

And L. Sprague de Camp is present with a yarn called "The Warrior Race." Were it not that the title is more than slightly moth-eaten, we'd have retitled it "The Earth Savers," which is a very appropriate title—after you've read the yarn. It's about two men who save the Earth from the crushing invaders—which is old—and restore man's freedom—which is also an old idea. But, gentlemen, the method is new to science-fiction. It is not done by any deadly weapon, nor by disease, nor by any method ever proposed or suggested. And, being a De Camp opus, it's magnificently logical—if slightly whacky. You're invited to spend the next few weeks seeing if you can figure out a way to free a conquered, enslaved mankind from the domination of the invaders without the use of any deadly agency.

THE EDITOR.

ANALYTICAL LABORATORY

July's Astounding hasn't been on the stands very long as I write this, but the reports so far are pretty consistent, so a fair estimate is probably shown already. It stands as follows:

1. Coventry
2. Crisis In Utopia
3. Dark Mission

Robert Heinlein
Norman L. Knight
Lester del Rey

4. and 5. were ties between the remaining stories. Letters indicate that von Rachen's "Idealist," Ryan's "Mosaic" and Ralph Williams' "Emergency Landing" were well and equally liked.

THE EDITOR.



By Robert Heinlein

Control was impossible—except on theory. And that drove men mad, and madmen invited an explosion that would wreck the planet!

Illustrated by Schneeman

AST-4

"Put down that wrench!"

The man addressed turned slowly around and faced the speaker. His expression was hidden by a grotesque helmet, part of a heavy, leaden armor which shielded his entire body, but the tone of voice in which he answered showed nervous exasperation.

"What the hell's eating on you, doc?" He made no move to replace the tool in question.

They faced each other like two helmeted, arrayed fencers, watching for an opening. The first speaker's voice came from behind his mask a shade higher in key and more peremptory in tone. "You heard me, Harper. Put down that wrench at once, and come away from that 'trigger.' Erickson!"

A third armored figure came around the shield which separated the uranium bomb proper from the control room in which the first two stood. "Whatcha want, doc?"

"Harper is relieved from watch. You take over as engineer-of-the-watch. Send for the stand-by engineer."

"Very well." His voice and manner were phlegmatic, as he accepted the situation without comment. The atomic engineer, whom he had just relieved, glanced from one to the other, then carefully replaced the wrench in its rack.

"Just as you say, Dr. Silard—but send for your relief, too. I shall demand an immediate hearing!" Harper swept indignantly out, his lead-sheathed boots clumping on the floor plates.

Dr. Silard waited unhappily for the ensuing twenty minutes until his own relief arrived. Perhaps he had been hasty. Maybe he was wrong in thinking that Harper had at last broken under the strain of tending the most dangerous machine in the world—an atomic power plant. But if he had made a mistake, it had to be on the safe side—slips *must not happen* in this business; not when a slip might result in the atomic detonation of two and a half tons of uranium.

He tried to visualize what that would mean, and failed. He had

been told that uranium was potentially forty million times as explosive as TNT. The figure was meaningless that way. He thought of it, instead, as a hundred million tons of high explosive, two hundred million aircraft bombs as big as the biggest ever used. It still did not mean anything. He had once seen such a bomb dropped, when he had been serving as a temperament analyst for army aircraft pilots. The bomb had left a hole big enough to hide an apartment house. He could not imagine the explosion of a thousand such bombs, much, much less a hundred million of them.

Perhaps these atomic engineers could. Perhaps, with their greater mathematical ability and closer comprehension of what actually went on inside the nuclear fission chamber—the "bomb"—they had some vivid glimpse of the mind-shattering horror locked up beyond that shield. If so, no wonder they tended to blow up—

He sighed. Erickson looked up from the linear resonant accelerator on which he had been making some adjustment. "What's the trouble, doc?"

"Nothing. I'm sorry I had to relieve Harper."

Silard could feel the shrewd glance of the big Scandinavian. "Not getting the jitters yourself, are you, doc? Sometimes you squirrel sleuths blow up, too—"

"Me? I don't think so. I'm scared of that thing in there—I'd be crazy if I weren't."

"So am I," Erickson told him soberly, and went back to his work.

THE ACCELERATOR'S snout disappeared in the shield between them and the bomb, where it fed a steady stream of terrifically speeded up subatomic bullets to the beryllium tar-

get located within the bomb itself. The tortured beryllium yielded up neutrons, which shot out in all directions through the uranium mass. Some of these neutrons struck uranium atoms squarely on their nuclei and split them in two. The fragments were new elements, barium, xenon, rubidium—depending on the proportions in which each atom split. The new elements were usually unstable isotopes and broke down into a dozen more elements by radioactive disintegration in a progressive chain reaction.

But these chain reactions were comparatively unimportant; it was the original splitting of the uranium nucleus, with the release of the awe-inspiring energy that bound it together—an incredible two hundred million electron-volts—that was important—and perilous.

For, while uranium isotope 235 may be split by bombarding it with neutrons from an outside source, the splitting itself gives up more neutrons which, in turn, may land in other uranium nuclei and split them. If conditions are favorable to a progressively increasing reaction of this sort, it may get out of hand, build up in an unmeasurable fraction of a micro-second into a complete atomic explosion—an explosion which would dwarf the eruption of Krakatoa to popgun size; an explosion so far beyond all human experience as to be as completely incomprehensible as the idea of personal death. It could be feared, but not understood.

But a self-perpetuating sequence of nuclear splitting, *just under the level of complete explosion*, was necessary to the operation of the power plant. To split the first uranium nucleus by bombarding it with neutrons from the beryllium target took more power than the death of the atom gave up. In order that the output

of power from the system should exceed the power input in useful proportion it was imperative that each atom split by a neutron from the beryllium target should cause the splitting of many more.

It was equally imperative that this chain of reactions should always tend to dampen, to die out. It must not build up, or the entire mass would explode within a time interval too short to be measured by any means whatsoever.

Nor would there be anyone left to measure it.

THE atomic engineer on duty at the bomb could control this reaction by means of the "trigger," a term the engineers used to include the linear resonant accelerator, the beryllium target, and the adjacent controls, instrument board, and power sources. That is to say, he could vary the bombardment on the beryllium target to increase or decrease the power output of the plant, and he could tell from his instruments that the internal reaction was dampened—or, rather, that it had been dampened the split second before. He could not possibly know what was actually happening *now* within the bomb—subatomic speeds are too great and the time intervals too small. He was like the bird that flew backward; he could see where he had been, but he never knew where he was going.

Nevertheless, it was his responsibility, and his alone, not only to maintain the bomb at a high input-output efficiency, but to see that the reaction never passed the critical point and progressed into mass explosion.

But that was impossible. He could not be sure; he could never be sure.

He could bring to the job all of the

skill and learning of the finest technical education, and use it to reduce the hazard to the lowest mathematical probability, but the blind laws of chance which appear to rule in subatomic action might turn up a royal flush against him and defeat his most skillful play.

And each atomic engineer knew it, knew that he gambled not only with his own life, but with the lives of countless others, perhaps with the lives of every human being on the planet. Nobody knew quite what such an explosion would do. The most conservative estimate assumed that, in addition to destroying the plant and its personnel completely, it would tear a chunk out of the populous and heavily traveled Los Angeles-Oklahoma Road City a hundred miles to the north.

That was the official, optimistic viewpoint on which the plant had been authorized, and based on mathematics which predicted that a mass of uranium would itself be disrupted on a molar scale, and thereby rendered comparatively harmless, before progressive and accelerated atomic explosion could infect the entire mass.

The atomic engineers, by and large, did not place faith in the official theory. They judged theoretical mathematical prediction for what it was worth—precisely nothing, until confirmed by experiment.

But even from the official viewpoint, each atomic engineer while on watch carried not only his own life in his hands, but the lives of many others—how many, it was better not to think about. No pilot, no general, no surgeon ever carried such a daily, inescapable, ever-present weight of responsibility for the lives of other people as these men carried every time they went on watch, every time

they touched a vernier screw or read a dial.

They were selected not alone for their intelligence and technical training, but quite as much for their characters and sense of social responsibility. Sensitive men were needed—men who could fully appreciate the importance of the charge intrusted to them; no other sort would do. But the burden of responsibility was too great to be borne indefinitely by a sensitive man.

It was, of necessity, a psychologically unstable condition. Insanity was an occupational disease.

DR. CUMMINGS appeared, still buckling the straps of the armor worn to guard against stray radiation. "What's up?" he asked Silard.

"I had to relieve Harper."

"So I guessed. I met him coming up. He was sore as hell—just glared at me."

"I know. He wants an immediate hearing. That's why I had to send for you."

Cummings grunted, then nodded toward the engineer, anonymous in all-inclosing armor. "Who'd I draw?"

"Erickson."

"Good enough. Squareheads can't go crazy—eh, Gus?"

Erickson looked up momentarily and answered, "That's your problem," and returned to his work.

Cummings turned back to Silard and commented: "Psychiatrists don't seem very popular around here. O. K.—I relieve you, sir."

"Very well, sir."

Silard threaded his way through the zigzag in the tanks of water which surrounded the disintegration room. Once outside this outer shield, he divested himself of the cumbersome armor, disposed of it in the locker room provided, and hurried to

a lift. He left the lift at the tube station, underground, and looked around for an unoccupied capsule. Finding one, he strapped himself in, sealed the gasketed door, and settled the back of his head into the rest against the expected surge of acceleration.

Five minutes later he knocked at the door of the office of the general superintendent, twenty miles away.

The power plant proper was located in a bowl of desert hills on the Arizona plateau. Everything not necessary to the immediate operation of the plant—administrative offices, television station and so forth—lay beyond the hills. The buildings housing these auxiliary functions were of the most durable construction technical ingenuity could devise. It was hoped that, if *der tag* ever came, occupants would stand approximately the chance of survival of a man going over Niagara Falls in a barrel.

Silard knocked again. He was greeted by a male secretary, Steinke. Silard recalled reading his case history. Formerly one of the most brilliant of the young engineers, he had suffered a blanking out of the ability to handle mathematical operations. A plain case of *fugue*, but there had been nothing that the poor devil could do about it—he had been anxious enough with his conscious mind to stay on duty. He had been rehabilitated as an office worker.

Steinke ushered him into the superintendent's private office. Harper was there before him, and returned his greeting with icy politeness. The superintendent was cordial, but Silard thought he looked tired, as if the twenty-four-hour-a-day strain was too much for him.

"Come in, doctor, come in. Sit down. Now tell me about this. I'm a little surprised. I thought Harper

was one of my steadiest men."

"I don't say he isn't, sir."

"Well?"

"He may be perfectly all right, but your instructions to me are not to take any chances."

"Quite right." The superintendent gave the engineer, silent and tense in his chair, a troubled glance, then returned his attention to Silard. "Suppose you tell me about it."

SILARD took a deep breath. "While on watch as psychological observer at the control station I noticed that the engineer of the watch seemed preoccupied and less responsive to stimuli than usual. During my off-watch observation of this case, over a period of the past several days, I have suspected an increasing lack of attention. For example, while playing contract bridge, he now occasionally asks for a review of the bidding, which is contrary to his former behavior pattern.

"Other similar data are available. To cut it short, at 3:11 today, while on watch, I saw Harper, with no apparent reasonable purpose in mind, pick up a wrench used only for operating the valves of the water shield and approach the trigger. I relieved him of duty and sent him out of the control room."

"Chief!" Harper calmed himself somewhat and continued: "If this witch doctor knew a wrench from an oscillator, he'd known what I was doing. The wrench was on the wrong rack. I noticed it, and picked it up to return it to its proper place. On the way, I stopped to check the readings!"

The superintendent turned inquiringly to Dr. Silard.

"That may be true. Granting that it is true," answered the psychiatrist doggedly, "my diagnosis still stands. Your behavior pattern

has altered; your present actions are unpredictable, and I can't approve you for responsible work without a complete check-up."

General Superintendent King drummed on the desk top and sighed. Then he spoke slowly to Harper: "Cal, you're a good boy, and, believe me, I know how you feel. But there is no way to avoid it—you've got to go up for the psychometricals, and accept whatever disposition the board makes of you." He paused, but Harper maintained an expressionless silence. "Tell you what, son—why don't you take a few days leave? Then, when you come back, you can go up before the board, or transfer to another department away from the bomb, whichever you prefer." He looked to Silard for approval, and received a nod.

But Harper was not mollified. "No, chief," he protested. "It won't do. Can't you see what's wrong? It's this constant supervision. Somebody always watching the back of your neck, *expecting* you to go crazy. A man can't even shave in private. We're jumpy about the most innocent acts, for fear some head doctor, half batty himself, will see it and decide it's a sign we're slipping. Good grief, what do you expect?" His outburst having run its course, he subsided into a flippant cynicism that did not quite jell. "O. K.—never mind the strait jacket; I'll go quietly. You're a good Joe in spite of it, chief," he added, "and I'm glad to have worked under you. Good-by."

King kept the pain in his eyes out of his voice. "Wait a minute, Cal—you're not through here. Let's forget about the vacation. I'm transferring you to the radiation laboratory. You belong in research, anyhow; I'd never have spared you from it to stand watches if I hadn't been short on No. 1 men.

"As for the constant psychological observation, I hate it as much as you do. I don't suppose you know that they watch me about twice as hard as they watch you duty engineers." Harper showed his surprise, but Silard nodded in sober confirmation. "But we have to have this supervision. Do you remember Manning? No, he was before your time. We didn't have psychological observers then. Manning was able and brilliant. Furthermore, he was always cheerful; nothing seemed to bother him.

"I was glad to have him on the bomb, for he was always alert, and never seemed nervous about working with it—in fact, he grew more buoyant and cheerful the longer he stood control watches. I should have known that was a very bad sign, but I didn't, and there was no observer to tell me so.

"His technician had to slug him one night. He found him dismounting the safety interlocks on the trigger. Poor old Manning never pulled out of it—he's been violently insane ever since. After Manning cracked up, we worked out the present system of two qualified engineers and an observer for every watch. It seemed the only thing to do."

"I suppose so, chief," Harper mused, his face no longer sullen, but still unhappy. "It's a hell of a situation just the same."

"That's putting it mildly," King rose and put out his hand. "Cal, unless you're dead set on leaving us, I'll expect to see you at the radiation laboratory tomorrow. Another thing—I don't often recommend this, but it might do you good to get drunk tonight."

KING HAD SIGNED to Silard to remain after the young man left. Once the door was closed he turned back

to the psychiatrist. "There goes another one—and one of the best. Doctor, what am I going to do?"

Silard pulled at his cheek. "I don't know," he admitted. "The hell of it is, Harper's absolutely right. It does increase the strain on them to know that they are being watched—and yet they have to be watched. Your psychiatric staff isn't doing too well, either. It makes us nervous to be around the bomb—the more so because we don't understand it. And it's a strain on us to be hated and despised as we are. Scientific detachment is difficult under such conditions; I'm getting jumpy myself."

King ceased pacing the floor and faced the doctor. "But there must be *some* solution—" he insisted.

Silard shook his head. "It's beyond me, superintendent. I see no solution from the standpoint of psychology."

"No? Hm-m-m. Doctor, who is the top man in your field?"

"Eh?"

"Who is the recognized No. 1 man in handling this sort of thing?"

"Why, that's hard to say. Naturally, there isn't any one leading psychiatrist in the world; we specialize too much. I know what you mean, though. You don't want the best industrial-temperament psychometrician; you want the best all-around man for psychoses nonlesional and situational. That would be Lentz."

"Go on."

"Well— He covers the whole field of environmental adjustment. He's the man who correlated the theory of optimum tonicity with the relaxation technique that Korzybski had developed empirically. He actually worked under Korzybski himself, when he was a young student—it's the only thing he's vain about."

"He did? Then he must be pretty

old; Korzybski died in— What year did he die?"

"I started to say that you must know his work in symbology—theory of abstraction and calculus of statement, all that sort of thing—because of its applications to engineering and mathematical physics."

"That Lentz—yes, of course. But I had never thought of him as a psychiatrist."

"No, you wouldn't, in your field. Nevertheless, we are inclined to credit him with having done as much to check and reduce the pandemic neuroses of the Crazy Years as any other man, and more than any man left alive."

"Where is he?"

"Why, Chicago, I suppose. At the Institute."

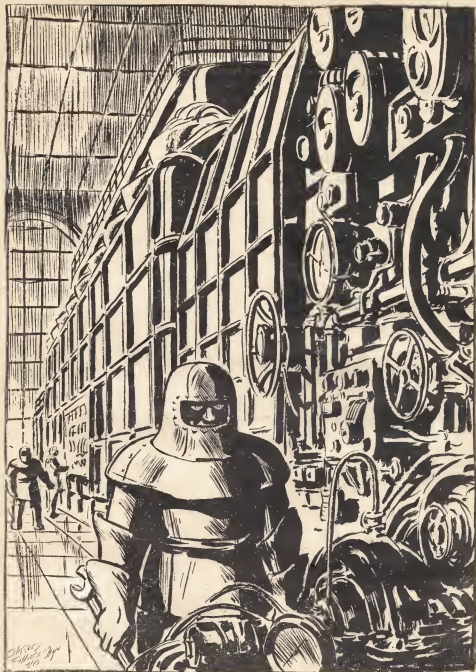
"Get him here."

"Eh?"

"Get him down here. Get on that visiphone and locate him. Then have Steinke call the Port of Chicago, and hire a stratocar to stand by for him. I want to see him as soon as possible—before the day is out." King sat up in his chair with the air of a man who is once more master of himself and the situation. His spirit knew that warming replenishment that comes only with reaching a decision. The harassed expression was gone.

Silard looked dumfounded: "But, superintendent," he expostulated, "you can't ring for Dr. Lentz as if he were a junior clerk. He's . . . he's *Lentz*."

"Certainly—that's why I want him. But I'm not a neurotic club-woman looking for sympathy, either. He'll come. If necessary, turn on the heat from Washington. Have the White House call him. But get him here at once. Move!" King strode out of the office.



The engineer stopped at the order. So, the psychologist had decided he was unstable—mad.

WHEN ERICKSON came off watch he inquired around and found that Harper had left for town. Accordingly, he dispensed with dinner at the base, shifted into "drinkin' clothes," and allowed himself to be dispatched via tube to Paradise.

Paradise, Arizona, was a hard little boom town, which owed its existence to the power plant. It was dedicated exclusively to the serious business of detaching the personnel of the plant from their inordinate salaries. In this worthy project they received much co-operation from the plant personnel themselves, each of whom was receiving from twice to ten times as much money each pay day as he had ever received in any other job, and none of whom was certain of living long enough to justify saving for old age. Besides, the company carried a sinking fund in Manhattan for their dependents; why be stingy?

It was said, with some truth, that any entertainment or luxury obtainable in New York City could be purchased in Paradise. The local chamber of commerce had appropriated the slogan of Reno, Nevada, "Biggest Little City in the World." The Reno boosters retaliated by claiming that, while any town that close to the atomic power plant undeniably brought thoughts of death and the hereafter, Hell's Gates would be a more appropriate name than Paradise.

Erickson started making the rounds. There were twenty-seven places licensed to sell liquor in the six blocks of the main street of Paradise. He expected to find Harper in one of them, and, knowing the man's habits and tastes, he expected to find him in the first two or three he tried.

He was not mistaken. He found Harper sitting alone at a table in the rear of DeLancey's Sans Souci Bar.

DeLancey's was a favorite of both of them. There was an old-fashioned comfort about its chrome-plated bar and red leather furniture that appealed to them more than did the spectacular fittings of the up-to-the-minute places. DeLancey was conservative; he stuck to indirect lighting and soft music; his hostesses were required to be fully clothed, even in the evening.

The fifth of Scotch in front of Harper was about two thirds full. Erickson shoved three fingers in front of Harper's face and demanded, "Count!"

"Three," announced Harper. "Sit down, Gus."

"That's correct," Erickson agreed, sliding his big frame into a low-slung chair. "You'll do—for now. What was the outcome?"

"Have a drink. Not," he went on, "that this Scotch is any good. I think Lance has taken to watering it. I surrendered, horse and foot."

"Lance wouldn't do that—stick to that theory and you'll sink in the sidewalk up to your knees. How come you capitulated? I thought you planned to beat 'em about the head and shoulders, at least."

"I did," mourned Harper, "but, cripes, Gus, the chief is right. If a brain mechanic says you're punchy, he has *got* to back him up and take you off the bomb. The chief can't afford to take a chance."

"Yeah, the chief's all right, but I can't learn to love our dear psychiatrists. Tell you what—let's find us one, and see if he can feel pain. I'll hold him while you slug 'im."

"Oh, forget it, Gus. Have a drink."

"A pious thought—but not Scotch. I'm going to have a martini; we ought to eat pretty soon."

"I'll have one, too."

"Do you good." Erickson lifted

his blond head and bellowed, "Israfel!"

A LARGE, black person appeared at his elbow. "Mistuh Erickson! Yes, suh!"

"Izzy, fetch two martinis. Make mine with Italian." He turned back to Harper. "What are you going to do now, Cal?"

"Radiation laboratory."

"Well, that's not so bad. I'd like to have a go at the matter or rocket fuels myself. I've got some ideas."

Harper looked mildly amused. "You mean atomic fuel for interplanetary flight? That problem's pretty well exhausted. No, son, the stratosphere is the ceiling until we think up something better than rockets. Of course, you *could* mount the bomb in a ship, and figure out some jury rig to convert its radiant output into push, but where does that get you? One bomb, one ship—and twenty years of mining in Little America has only produced enough pitchblende to make one bomb. That's disregarding the question of getting the company to lend you their one bomb for anything that doesn't pay dividends."

Erickson looked balky. "I don't concede that you've covered all the alternatives. What have we got? The early rocket boys went right ahead trying to build better rockets, serene in the belief that, by the time they could build rockets good enough to fly to the Moon, a fuel would be perfected that would do the trick. And they did build ships that were good enough—you could take any ship that makes the antipodes run, and refit it for the Moon—if you had a fuel that was sufficiently concentrated to maintain the necessary push for the whole run. But they haven't got it.

"And why not? Because we let

'em down, that's why. Because they're still depending on molecular energy, on chemical reactions, with atomic power sitting right here in our laps. It's not their fault—old D. D. Harriman had Rockets Consolidated underwrite the whole first issue of Antarctic Pitchblende, and took a big slice of it himself, in the expectation that we would produce something usable in the way of a concentrated rocket fuel. Did we do it? Like hell! The company went hog-wild for immediate commercial exploitation, and there's no fuel yet."

"But you haven't stated it properly," Harper objected. "There are just two forms of atomic power available, radioactivity and atomic disintegration. The first is too slow; the energy is there, but you can't wait years for it to come out—not in a rocketship. The second we can only manage in a large mass of uranium. There has only been enough uranium mined for one bomb. There you are—stymied."

ERICKSON'S Scandinavian stubbornness was just gathering for another try at the argument when the waiter arrived with the drinks. He set them down with a triumphant flourish. "There you are, suh!"

"Want to roll for them, Izzy?" Harper inquired.

"Don' mind if I do."

The Negro produced a leather dice cup, and Harper rolled. He selected his combinations with care and managed to get four aces and jack in three rolls. Israfel took the cup. He rolled in the grand manner with a backward twist to his wrist. His score finished at five kings, and he courteously accepted the price of six drinks. Harper stirred the engraved cubes with his forefinger.

"Izzy," he asked, "are these the same dice I rolled with?"

"Why, Mistuh Harper!" The Negro's expression was pained.

"Skip it," Harper conceded. "I should know better than to gamble with you. I haven't won a roll from you in six weeks. What did you start to say, Gus?"

"I was just going to say that there ought to be a better way to get energy out of—"

But they were joined again, this time by something very seductive in an evening gown that appeared to have been sprayed on her lush figure. She was young, perhaps nineteen or twenty. "You boys lonely?" she asked as she flowed into a chair.

"Nice of you to ask, but we're not," Erickson denied with patient politeness. He jerked a thumb at a solitary figure seated across the room. "Go talk to Hannigan; he's not busy."

She followed his gesture with her eyes, and answered with faint scorn: "Him? He's no use. He's been like that for three weeks—hasn't spoken to a soul. If you ask me, I'd say that he was cracking up."

"That so?" he observed noncommittally. "Here"—he fished out a five-dollar bill and handed it to her—"buy yourself a drink. Maybe we'll look you up later."

"Thanks, boys." The money disappeared under her clothing, and she stood up. "Just ask for Edith."

"Hannigan does look bad," Harper considered, noting the brooding stare and apathetic attitude, "and he has been awfully stand-offish lately, for him. Do you suppose we're obliged to report him?"

"Don't let it worry you," advised Erickson. "There's a spotter on the job now. Look." Harper followed his companion's eyes and recognized Dr. Mott of the psychological staff. He was leaning against the far end of the bar, and nursing a tall glass,

which gave him protective coloration. But his stance was such that his field of vision included not only Hannigan, but Erickson and Harper as well.

"Yeah, and he's studying us as well," Harper added. "Damn it to hell, why does it make my back hair rise just to lay eyes on one of them?"

The question was rhetorical; Erickson ignored it. "Let's get out of here," he suggested, "and have dinner somewhere else."

"O. K."

DeLancey himself waited on them as they left. "Going so soon, gentlemen?" he asked, in a voice that implied that their departure would leave him no reason to stay open. "Beautiful lobster thermidor tonight. If you do not like it, you need not pay." He smiled brightly.

"Not sea food, Lance," Harper told him, "not tonight. Tell me—why do you stick around here when you know that the bomb is bound to get you in the long run? Aren't you afraid of it?"

The tavernkeeper's eyebrows shot up. "Afraid of the bomb? But it is my friend!"

"Makes you money, eh?"

"Oh, I do not mean that." He leaned toward them confidentially. "Five years ago I come here to make some money quickly for my family before my cancer of the stomach, it kills me. At the clinic, with the wonderful new radiants you gentlemen make with the aid of the bomb, I am cured—I live again. No, I am not afraid of the bomb; it is my good friend."

"Suppose it blows up?"

"When the good Lord needs me, He will take me." He crossed himself quickly.

As they turned away, Erickson commented in a low voice to Harper. "There's your answer, Cal—if all us

engineers had his faith, the bomb wouldn't get us down."

Harper was unconvinced. "I don't know," he mused. "I don't think it's faith; I think it's lack of imagination—and knowledge."

NOTWITHSTANDING King's confidence, Lentz did not show up until the next day. The superintendent was subconsciously a little surprised at his visitor's appearance. He had pictured a master psychologist as wearing flowing hair, an imperial, and having piercing black eyes. But this man was not very tall, was heavy in his framework, and fat—almost gross. He might have been a butcher. Little, piggy, faded-blue eyes peered merrily out from beneath shaggy blond brows. There was no hair anywhere else on the enormous skull, and the apelike jaw was smooth and pink. He was dressed in mussed pajamas of unbleached linen. A long cigarette holder jutted permanently from one corner of a wide mouth, widened still more by a smile which suggested unmalicious amusement at the worst that life, or men, could do. He had gusto.

King found him remarkably easy to talk to.

At Lentz's suggestion the superintendent went first into the history of the atomic power plant, how the fission of the uranium atom by Dr. Otto Hahn in December, 1938, had opened up the way to atomic power. The door was opened just a crack; the process to be self-perpetuating and commercially usable required an enormously greater mass of uranium than there was available in the entire civilized world at that time.

But the discovery, fifteen years later, of enormous deposits of pitchblende in the old rock underlying Little America removed that obstacle. The deposits were similar to

those previously worked at Great Bear Lake in the arctic north of Canada, but so much more extensive that the eventual possibility of accumulating enough uranium to build an atomic power plant became evident.

The demand for commercially usable, cheap power had never been satiated. Even the Douglas-Martin sunpower screens, used to drive the roaring road cities of the period and for a myriad other industrial purposes, were not sufficient to fill the ever-growing demand. They had saved the country from impending famine of oil and coal, but their maximum output of approximately one horsepower per square yard of sun-illuminated surface put a definite limit to the power from that source available in any given geographical area.

Atomic power was needed—was demanded.

But theoretical atomic physics predicted that a uranium mass sufficiently large to assist in its own disintegration might assist too well—blow up instantaneously, with such force that it would probably wreck every man-made structure on the globe and conceivably destroy the entire human race as well. They dared not build the bomb, even though the uranium was available.

"It was Destry's mechanics of infinitesimals that showed a way out of the dilemma," King went on. "His equations appeared to predict that an atomic explosion, once started, would disrupt the molar mass inclosing it so rapidly that neutron loss through the outer surface of the fragments would dampen the progression of the atomic explosion to zero before complete explosion could be reached.

"For the mass we use in the bomb, his equations predict a possible force

of explosion one seventh of one percent of the force of complete explosion. That alone, of course, would be incomprehensibly destructive—about the equivalent of a hundred and forty thousand tons of TNT—enough to wreck this end of the State. Personally, I've never been sure that is all that would happen."

"Then why did you accept this job?" inquired Lentz.

King fiddled with items on his desk before replying. "I couldn't turn it down, doctor—I *couldn't*. If I had refused, they would have gotten someone else—and it was an opportunity that comes to a physicist once in history."

Lentz nodded. "And probably they would have gotten someone not as competent. I understand, Dr. King—you were compelled by the 'truth-tropism' of the scientist. He must go where the data is to be found, even if it kills him. But about this fellow Destry, I've never liked his mathematics; he postulates too much."

King looked up in quick surprise, then recalled that this was the man who had refined and given rigor to the calculus of statement. "That's just the hitch," he agreed. "His work is brilliant, but I've never been sure that his predictions were worth the paper they were written on. Nor, apparently," he added bitterly, "do my junior engineers."

He told the psychiatrist of the difficulties they had had with personnel, of how the most carefully selected men would, sooner or later, crack under the strain. "At first I thought it might be some degenerating effect from the hard radiation that leaks out of the bomb, so we improved the screening and the personal armor. But it didn't help. One young fellow who had joined us after the new screening was installed be-

came violent at dinner one night, and insisted that a pork chop was about to explode. I hate to think of what might have happened if he had been on duty at the bomb when he blew up."

THE INAUGURATION of the system of constant psychological observation had greatly reduced the probability of acute danger resulting from a watch engineer cracking up, but King was forced to admit that the system was not a success; there had actually been a marked increase in psychoneuroses, dating from that time.

"And that's the picture, Dr. Lentz. It gets worse all the time. It's getting me now. The strain is telling on me; I can't sleep, and I don't think my judgment is as good as it used to be—I have trouble making up my mind, of coming to a decision. Do you think you can do anything for us?"

But Lentz had no immediate relief for his anxiety. "Not so fast, superintendent," he countered. "You have given me the background, but I have no real data as yet. I must look around for a while, smell out the situation for myself, talk to your engineers, perhaps have a few drinks with them, and get acquainted. That is possible, is it not? Then in a few days, maybe, we'll know where we stand."

King had no alternative but to agree.

"And it is well that your young men do not know what I am here for. Suppose I am your old friend, a visiting physicist, eh?"

"Why, yes—of course. I can see to it that that idea gets around. But say—" King was reminded again of something that had bothered him from the time Silard had first sug-

gested Lentz's nante, "may I ask a personal question?"

The merry eyes were undisturbed. "Go ahead."

"I can't help but be surprised that one man should attain eminence in two such widely differing fields as psychology and mathematics. And right now I'm perfectly convinced of your ability to pass yourself off as a physicist. I don't understand it."

The smile was more amused, without being in the least patronizing, nor offensive. "Same subject," he answered.

"Eh? How's that—"

"Or rather, both mathematical physics and psychology are branches of the same subject, symbolology. You are a specialist; it would not necessarily come to your attention."

"I still don't follow you."

"No? Man lives in a world of ideas. Any phenomenon is so complex that he cannot possibly grasp the whole of it. He abstracts certain characteristics of a given phenomenon as an idea, then represents that idea as a symbol, be it a word or a mathematical sign. Human reaction is almost entirely reaction to symbols, and only negligibly to phenomena. As a matter of fact," he continued, removing the cigarette holder from his mouth and settling into his subject, "it can be demonstrated that the human mind can think only in terms of symbols."

"When we think, we let symbols operate on other symbols in certain, set fashions—rules of logic, or rules of mathematics. If the symbols have been abstracted so that they are structurally similar to the phenomena they stand for, and if the symbol operations are similar in structure and order to the operations of phenomena in the real world, we think sanely. If our logic-mathematics, or our word-symbols, have been poorly

chosen, we think not sanely."

"In mathematical physics you are concerned with making your symbolology fit physical phenomena. In psychiatry I am concerned with precisely the same thing, except that I am more immediately concerned with the man who does the thinking than with the phenomena he is thinking about. But the same subject, always the same subject."

"WE'RE not getting any place, Gus." Harper put down his slide rule and frowned.

"Seems like it, Cal," Erickson grudgingly admitted. "Damn it, though—there ought to be some reasonable way of tackling the problem. What do we need? Some form of concentrated, controllable power for rocket fuel. What have we got? Power galore in the bomb. There must be some way to bottle that power, and serve it out when we need it—and the answer is some place in one of the radioactive series. I know it." He stared glumly around the laboratory as if expecting to find the answer written somewhere on the lead-sheathed walls.

"Don't be so down in the month about it. You've got me convinced there is an answer; let's figure out how to find it. In the first place the three natural radioactive series are out, aren't they?"

"Yes—at least we had agreed that all that ground had been fully covered before."

"O. K.; we have to assume that previous investigators have done what their notes show they have done—otherwise we might as well not believe anything, and start checking on everybody from Archimedes to date. Maybe that is indicated, but Methuselah himself couldn't carry out such an assignment. What have we got left?"

"Artificial radioactives."

"All right. Let's set up a list of them, both those that have been made up to now, and those that might possibly be made in the future. Call that our group—or rather, field, if you want to be pedantic about definitions. There are a limited number of operations that can be performed on each member of the group, and on the members taken in combination. Set it up."

Erickson did so, using the curious curlicues of the calculus of statement. Harper nodded. "All right—expand it."

Erickson looked up after a few moments, and asked, "Cal, have you any idea how many terms there are in the expansion?"

"No—hundreds, maybe thousands, I suppose."

"You're conservative. It reaches four figures without considering possible new radioactives. We couldn't finish such a research in a century." He clucked his pencil down and looked morose.

Cal Harper looked at him curiously, but with sympathy. "Gus," he said gently, "the bomb isn't getting you, too, is it?"

"I don't think so. Why?"

"I never saw you so willing to give up anything before. Naturally you and I will never finish any such job, but at the very worst we will have eliminated a lot of wrong answers for somebody else. Look at Edison—sixty years of experimenting, twenty hours a day, yet he never found out the one thing he was most interested in knowing. I guess if he could take it, we can."

Erickson pulled out of his funk to some extent. "I suppose so," he agreed. "Anyhow, maybe we could work out some techniques for carrying a lot of experiments simultaneously."

Harper slapped him on the shoulder. "That's the ol' fight. Besides—we may not need to finish the research, or anything like it, to find a satisfactory fuel. The way I see it, there are probably a dozen, maybe a hundred, right answers. We may run across one of them any day. Anyhow, since you're willing to give me a hand with it in your off-watch time, I'm game to peck away at it till hell freezes."

LENTZ pattered around the plant and the administration center for several days, until he was known to everyone by sight. He made himself pleasant and asked questions. He was soon regarded as a harmless nuisance, to be tolerated because he was a friend of the superintendent. He even poked his nose into the commercial power end of the plant, and had the mercury-steam-turbogenerator sequence explained to him in detail. This alone would have been sufficient to disarm any suspicion that he might be a psychiatrist, for the staff psychiatrists paid no attention to the hard-bitten technicians of the power-conversion unit. There was no need to; mental instability on their part could not affect the bomb, nor were they subject to the man-killing strain of social responsibility. Theirs was simply a job personally dangerous, a type of strain strong men have been injured to since the jungle.

In due course he got around to the unit of the radiation laboratory set aside for Calvin Harper's use. He rang the bell and waited. Harper answered the door, his antiradiation helmet shoved back from his face like a grotesque sunbonnet. "What is it?" he asked. "Oh—it's you, Dr. Lentz. Did you want to see me?"

"Why, yes and no," the older man answered. "I was just looking

around the experimental station, and wondered what you do in here. Will I be in the way?"

"Not at all. Come in, Gus!"

Erickson got up from where he had been fussing over the power leads to their tigger—a modified cyclotron rather than a resonant accelerator. "Hello."

"Gus, this is Dr. Lentz—Gus Erickson."

"We've met," said Erickson, pulling off his gauntlet to shake hands. He had had a couple of drinks with Lentz in town and considered him a "nice old duck." "You're just between shows, but stick around and we'll start another run—not that there is much to see."

While Erickson continued with the set-up, Harper conducted Lentz around the laboratory, explaining the line of research they were conducting, as happy as a father showing off twins. The psychiatrist listened with one ear and made appropriate comments while he studied the young scientist for signs of the instability he had noted to be recorded against him.

"You see," Harper explained, oblivious to the interest in himself, "we are testing radioactive materials to see if we can produce disintegration of the sort that takes place in the bomb, but in a minute, almost microscopic, mass. If we are successful, we can use the power of the bomb to make a safe, convenient, atomic fuel for rockets." He went on to explain their schedule of experimentation.

"I see," Lentz observed politely. "What metal are you examining now?"

Harper told him. "But it's not a case of examining one element—we've finished Isotope II with negative results. Our schedule calls next for running the same test on Iso-

tope V. Like this." He hauled out a lead capsule, and showed the label to Lentz, who saw that it was, indeed, marked with the symbol of the fifth isotope. He hurried away to the shield around the target of the cyclotron, left open by Erickson. Lentz saw that he had opened the capsule, and was performing some operation on it in a gingerly manner, having first lowered his helmet. Then he closed and clamped the target shield.

"O. K., Gus?" he called out. "Ready to roll?"

"Yeah, I guess so," Erickson assured him, coming around from behind the ponderous apparatus, and rejoining them. They crowded behind a thick metal shield that cut them off from direct sight of the set-up.

"Will I need to put on armor?" inquired Lentz.

"No," Erickson reassured him, "we wear it because we are around the stuff day in and day out. You just stay behind the shield and you'll be all right. It's lead—backed up by eight inches of case-hardened armor plate.

ERICKSON glanced at Harper, who nodded, and fixed his eyes on a panel of instruments mounted behind the shield. Lentz saw Erickson press a push button at the top of the board, then heard a series of relays click on the far side of the shield. There was a short moment of silence.

The floor slapped his feet like some incredible bastinado. The concussion that beat on his ears was so intense that it paralyzed the auditory nerve almost before it could be recorded as sound. The air-conducted concussion wave flailed every inch of his body with a single, stinging, numbing blow. As he picked himself up, he found he was trembling

uncontrollably and realized, for the first time, that he was getting old.

Harper was seated on the floor and had commenced to bleed from the nose. Erickson had gotten up; his cheek was cut. He touched a hand to the wound, then stood there, regarding the blood on his fingers with a puzzled expression on his face.

"Are you hurt?" Lentz inquired inanely. "What happened?"

Harper cut in. "Gus, we've done it! We've done it! Isotope V's turned the trick!"

Erickson looked still more bemused. "Five?" he said stupidly. "But that wasn't Five; that was Isotope II. I put it in myself."

"You put it in? I put it in! It was Five, I tell you!"

They stood staring at each other, still confused by the explosion, and each a little annoyed at the bone-headed stupidity the other displayed in the face of the obvious. Lentz diffidently interceded.

"Wait a minute, boys," he suggested. "Maybe there's a reason—Gus, you placed a quantity of the second isotope in the receiver?"

"Why, yes, certainly. I wasn't satisfied with the last run, and I wanted to check it."

Lentz nodded. "It's my fault, gentlemen," he admitted ruefully. "I came in and disturbed your routine, and both of you charged the receiver. I know Harper did, for I saw him do it—with Isotope V. I'm sorry."

Understanding broke over Harper's face, and he slapped the older man on the shoulder. "Don't be sorry," he laughed; "you can come around to our lab and help us make mistakes any time you feel in the mood. Can't he, Gus? This is the answer, Dr. Lentz; this is it!"

"But," the psychiatrist pointed

out, "you don't know which isotope blew up."

"Nor care," Harper supplemented. "Maybe it was both, taken together. But we *will* know—this business is cracked now; we'll soon have it open." He gazed happily around at the wreckage.

IN SPITE of Superintendent King's anxiety, Lentz refused to be hurried in passing judgment on the situation. Consequently, when he did present himself at King's office, and announced that he was ready to report, King was pleasantly surprised as well as relieved. "Well, I'm delighted," he said. "Sit down, doctor, sit down. Have a cigar. What do we do about it?"

But Lentz stuck to his perennial cigarette and refused to be hurried. "I must have some information first. How important," he demanded, "is the power from your plant?"

King understood the implication at once. "If you are thinking about shutting down the bomb for more than a limited period, it can't be done."

"Why not? If the figures supplied me are correct, your output is less than thirteen percent of the total power used in the country."

"Yes, that is true, but you haven't considered the items that go in to make up the total. A lot of it is domestic power, which householders get from sunscreens located on their own roofs. Another big slice is power for the moving roadways—that's sun-power again. The portion we provide here is the main power source for most of the heavy industries—steel, plastics, lithics, all kinds of manufacturing and processing. You might as well cut the heart out of a man—"

"But the food industry isn't basi-

cally dependent on you?" Lentz persisted.

"No. Food isn't basically a power industry—although we do supply a certain percentage of the power used in processing. I see your point, and will go on and concede that transportation—that is to say, distribution of food—could get along without us. But, good heavens, doctor, you can't stop atomic power without causing the biggest panic this country has ever seen. It's the keystone of our whole industrial system."

"The country has lived through panics before, and we got past the oil shortage safely."

"Yes—because atomic power came along to take the place of oil. You don't realize what this would mean, doctor. It would be worse than a war; in a system like ours, one thing depends on another. If you cut off the heavy industries all at once, everything else stops, too."

"Nevertheless, you had better dump the bomb." The uranium in the bomb was molten, its temperature being greater than twenty-four hundred degrees centigrade. The bomb could be dumped into a group of small containers, when it was desired to shut it down. The mass in any one container was too small to maintain progressive atomic disintegration.

King glanced involuntarily at the glass-enclosed relay mounted on his office wall, by which he, as well as the engineer on duty, could dump the bomb, if need be. "But I couldn't do that—or rather, if I did, the plant wouldn't stay shut down. The directors would simply replace me with someone who *would* operate the bomb."

"You're right, of course." Lentz silently considered the situation for some time, then said, "Superintend-

ent, will you order a car to fly me back to Chicago?"

"You're going, doctor?"

"Yes." He took the cigarette holder from his face, and, for once, the smile of Olympian detachment was gone completely. His entire manner was sober, even tragic. "Short of shutting down the bomb, there is no solution to your problem—none whatsoever!"

"I OWE YOU a full explanation," Lentz continued, at length. "You are confronted here with recurring instances of situational psychoneurosis. Roughly, the symptoms manifest themselves as anxiety neurosis or some form of hysteria. The partial amnesia of your secretary, Steinke, is a good example of the latter. He might be cured with shock technique, but it would hardly be a kindness, as he has achieved a stable adjustment which puts him beyond the reach of the strain he could not stand.

"That other young fellow, Harper, whose blowup was the immediate cause of your sending for me, is an anxiety case. When the cause of the anxiety was eliminated from his matrix, he at once regained full sanity. But keep a close watch on his friend, Erickson—

"However, it is the cause, and prevention, of situational psychoneurosis we are concerned with here, rather than the forms in which it is manifested. In plain language, psychoneurosis situational simply refers to the common fact that, if you put a man in a situation that worries him more than he can stand, in time he blows up, one way or another.

"That is precisely the situation here. You take sensitive, intelligent young men, impress them with the fact that a single slip on their part, or even some fortuitous circumstance

beyond their control, will result in the death of God knows how many other people, and then expect them to remain sane. It's ridiculous—impossible!"

"But good heavens, doctor, there must be some answer! There must!" He got up and paced around the room. Lentz noted, with pity, that King himself was riding the ragged edge of the very condition they were discussing.

"No," he said slowly. "No. Let me explain. You don't dare intrust the bomb to less sensitive, less socially conscious men. You might as well turn the controls over to a mindless idiot. And to psychoneurosis situational there are but two cures. The first obtains when the psychosis results from a misvaluation of environment. That cure calls for semantic readjustment. One assists the patient to evaluate correctly his environment. The worry disappears because there never was a real reason for worry in the situation itself, but simply in the wrong meaning the patient's mind had assigned to it.

"The second case is when the patient has correctly evaluated the situation, and rightly finds in it cause for extreme worry. His worry is perfectly sane and proper, but he can not stand up under it indefinitely; it drives him crazy. The only possible cure is to change the situation. I have stayed here long enough to assure myself that such is the condition here. Your engineers have correctly evaluated the public danger of this bomb, and it will, with dreadful certainty, drive all of you crazy!

"The only possible solution is to dump the bomb—and leave it dumped."

KING had continued his nervous pacing of the floor, as if the walls of the room itself were the cage of his

dilemma. Now he stopped and appealed once more to the psychiatrist. "Isn't there *anything* I can do?"

"Nothing to cure. To alleviate—well, possibly."

"How?"

"Situational psychosis results from adrenalin exhaustion. When a man is placed under a nervous strain, his adrenal glands increase their secretion to help compensate for the strain. If the strain is too great and lasts too long, the adrenals aren't equal to the task, and he cracks. That is what you have here. Adrenalin therapy might stave off a mental breakdown, but it most assuredly would hasten a physical breakdown. But that would be safer from a viewpoint of public welfare—even though it assumes that physicists are expendable!

"Another thing occurs to me: If you selected any new watch engineers from the membership of churches that practice the confessional, it would increase the length of their usefulness."

King was plainly surprised. "I don't follow you."

"The patient unloads most of his worry on his confessor, who is not himself actually confronted by the situation, and can stand it. That is simply an ameliorative, however. I am convinced that, in this situation, eventual insanity is inevitable. But there is a lot of good sense in the confessional," he added. "It fills a basic human need. I think that is why the early psychoanalysts were so surprisingly successful, for all their limited knowledge." He fell silent for a while, then added, "If you will be so kind as to order a stratocab for me—"

"You've nothing more to suggest?"

"No. You had better turn your psychological staff loose on means of

alleviation; they're able men, all of them."

King pressed a switch and spoke briefly to Steinke. Turning back to Lentz, he said, "You'll wait here until your car is ready?"

Lentz judged correctly that King desired it and agreed.

Presently the tube delivery on King's desk went *ping!* The superintendent removed a small white pasteboard, a calling card. He studied it with surprise and passed it over to Lentz. "I can't imagine why he should be calling on me," he observed, and added, "Would you like to meet him?"

Lentz read:

THOMAS P. HARRINGTON

CAPTAIN (MATHEMATICS)

UNITED STATES NAVY

DIRECTOR,

U. S. NAVAL OBSERVATORY

"But I do know him," he said. "I'd be very pleased to see him."

HARRINGTON was a man with something on his mind. He seemed relieved when Steinke had finished ushering him in, and had returned to the outer office. He commenced to speak at once, turning to Lentz, who was nearer to him than King. "You're King? . . . Why, Dr. Lentz! What are you doing here?"

"Visiting," answered Lentz, accurately but incompletely, as he shook hands. "This is Superintendent King over here. Superintendent King—Captain Harrington."

"How do you do, captain—it's a pleasure to have you here."

"It's an honor to be here, sir."

"Sit down?"

"Thanks." He accepted a chair and laid a brief case on a corner of King's desk. "Superintendent, you are entitled to an explanation as to

why I have broken in on you like this—"

"Glad to have you." In fact, the routine of formal politeness was an anodyne to King's frayed nerves.

"That's kind of you, but— That secretary chap, the one that brought me in here, would it be too much to ask you to tell him to forget my name? I know it seems strange—"

"Not at all." King was mystified, but willing to grant any reasonable request of a distinguished colleague in science. He summoned Steinke to the interoffice visiphone and gave him his orders.

Lentz stood up and indicated that he was about to leave. He caught Harrington's eye. "I think you want a private palaver, captain."

King looked from Harrington to Lentz and back to Harrington. The astronomer showed momentary indecision, then protested: "I have no objection at all myself; it's up to Dr. King. As a matter of fact," he added, "it might be a very good thing if you did sit in on it."

"I don't know what it is, captain," observed King, "that you want to see me about, but Dr. Lentz is already here in a confidential capacity."

"Good! Then that's settled. I'll get right down to business. Dr. King, you know Destry's mechanics of infinitesimals?"

"Naturally." Lentz cocked a brow at King, who chose to ignore it.

"Yes, of course. Do you remember theorem six and the transformation between equations thirteen and fourteen?"

"I think so, but I'd want to see them." King got up and went over to a bookcase. Harrington stayed him with a hand.

"Don't bother. I have them here." He hauled out a key, unlocked his brief case, and drew out



"That proves the assumption was wrong. It's mathematically certain that if that power plant blows—the Earth blows with it!"

a large, much-thumbed, loose-leaf notebook. "Here. You, too, Dr. Lentz. Are you familiar with this development?"

Lentz nodded. "I've had occasion to look into them."

"Good—I think it's agreed that the step between thirteen and fourteen is the key to the whole matter. Now, the change from thirteen to fourteen looks perfectly valid—and would be, in some fields. But sup-

pose we expand it to show every possible phase of the matter, every link in the chain of reasoning."

He turned a page and showed them the same two equations broken down into nine intermediate equations. He placed a finger under an associated group of mathematical symbols. "Do you see that? Do you see what that implies?" He peered anxiously at their faces.

King studied it, his lips moving.

"Yes . . . I believe I do see. Odd . . . I never looked at it just that way before—yet I've studied those equations until I've dreamed about them." He turned to Lentz. "Do you agree, doctor?"

Lentz nodded slowly. "I believe so. . . . Yes, I think I may say so."

Harrington should have been pleased; he wasn't. "I had hoped you could tell me I was wrong," he said, almost petulantly, "but I'm afraid there is no further doubt about it. Dr. Destry included an assumption valid in molar physics, but for which we have absolutely no assurance in atomic physics. I suppose you realize what this means to you, Dr. King?"

King's voice was a dry whisper. "Yes," he said, "yes— It means that if that bomb out there ever blows up, we must assume that it will go up all at once, rather than the way Destry predicted—and God help the human race!"

CAPTAIN HARRINGTON cleared his throat to break the silence that followed. "Superintendent," he said, "I would not have ventured to call had it been simply a matter of disagreement as to interpretation of theoretical predictions—"

"You have something more to go on?"

"Yes and no. Probably you gentlemen think of the Naval Observatory as being exclusively preoccupied with ephemerides and tide tables. In a way you would be right—but we still have some time to devote to research as long as it doesn't cut into the appropriation. My special interest has always been lunar theory.

"I don't mean lunar ballistics," he continued. "I mean the much more interesting problem of its origin and history, the problem the younger Darwin struggled with, as well as my

illustrious predecessor, Captain T. J. J. See. I think that it is obvious that any theory of lunar origin and history must take into account the surface features of the Moon—especially the mountains, the craters, that mark its face so prominently."

He paused momentarily, and Superintendent King put in: "Just a minute, captain—I may be stupid, or perhaps I missed something, but—is there a connection between what we were discussing before and lunar theory?"

"Bear with me for a few moments, Dr. King," Harrington apologized. "There is a connection—at least, I'm afraid there is a connection—but I would rather present my points in their proper order before making my conclusions." They granted him an alert silence; he went on:

"Although we are in the habit of referring to the 'craters' of the Moon, we know they are not volcanic craters. Superficially, they follow none of the rules of terrestrial volcanoes in appearance or distribution, but when Rutter came out in 1952 with his monograph on the dynamics of vulcanology, he proved rather conclusively that the lunar craters could not be caused by anything that we know as volcanic action.

"That left the bombardment theory as the simplest hypothesis. It looks good, on the face of it, and a few minutes spent throwing pebbles into a patch of mud will convince anyone that the lunar craters could have been formed by falling meteors.

"But there are difficulties. If the Moon was struck so repeatedly, why not the Earth? It hardly seems necessary to mention that the Earth's atmosphere would be no protection against masses big enough to form craters like Endymion or Plato. And if they fell after the Moon was a dead world while the Earth was still young

enough to change its face and erase the marks of bombardment, why did the meteors avoid so nearly completely the great dry basins we call lunar seas?

"I want to cut this short; you'll find the data and the mathematical investigations from the data here in my notes. There is one other major objection to the meteor-bombardment theory: the great rays that spread from Tycho across almost the entire surface of the Moon. It makes the Moon look like a crystal ball that had been struck with a hammer, and impact from outside seems evident, but there are difficulties. The striking mass, our hypothetical meteor, must be small enough to have formed the crater of Tycho, but it must have the mass and speed to crack an entire planet.

"Work it out for yourself—you must either postulate a chunk out of the core of a dwarf star, or speeds such as we have never observed within the system. It's conceivable but a farfetched explanation."

He turned to King. "Doctor, does anything occur to you that might account for a phenomenon like Tycho?"

The superintendent grasped the arms of his chair, then glanced at his palms. He fumbled for a handkerchief, and wiped them. "Go ahead," he said, almost inaudibly.

"VERY WELL then." Harrington drew out of his brief case a large photograph of the Moon—a beautiful full-Moon portrait made at Lick. "I want you to imagine the Moon as she might have been sometime in the past. The dark areas we call the 'seas' are actual oceans. It has an atmosphere, perhaps a heavier gas than oxygen and nitrogen, but an active gas, capable of supporting some conceivable form of life.

"For this is an inhabited planet,

inhabited by intelligent beings, beings capable of discovering atomic power and exploiting it!"

He pointed out on the photograph, near the southern limb, the lime-white circle of Tycho, with its shining, incredible, thousand-mile-long rays spreading, thrusting, jutting out from it. "Here . . . here at Tycho was located their main power plant." He moved his finger to a point near the equator and somewhat east of meridian—the point where three great dark areas merged, *Mare Nubium*, *Mare Imbrium*, *Oceanus Procellarum*—and picked out two bright splotches surrounded, also, by rays, but shorter, less distinct, and wavy. "And here at Copernicus and at Kepler, on islands at the middle of a great ocean, were secondary power stations."

He paused, and interpolated soberly: "Perhaps they knew the danger they ran, but wanted power so badly that they were willing to gamble the life of their race. Perhaps they were ignorant of the ruinous possibilities of their little machines, or perhaps their mathematicians assured them that it could not happen.

"But we will never know—no one can ever know. For it blew up and killed them—and it killed their planet.

"It whisked off the gassy envelope and blew it into outer space. It blasted great chunks off the planet's crust. Perhaps some of that escaped completely, too, but all that did not reach the speed of escape fell back down in time and splashed great ring-shaped craters in the land.

"The oceans cushioned the shock; only the more massive fragments formed craters through the water. Perhaps some life still remained in those ocean depths. If so, it was doomed to die—for the water, unprotected by atmospheric pressure,

could not remain liquid and must inevitably escape in time to outer space. Its lifeblood drained away. The planet was dead—dead by suicide!”

He met the grave eyes of his two silent listeners with an expression almost of appeal. “Gentlemen . . . this is only a theory, I realize . . . only a theory, a dream, a nightmare . . . but it has kept me awake so many nights that I had to come tell you about it, and see if you saw it the same way I do. As for the mechanics of it, it’s all in there in my notes. You can check it—and I pray that you find some error! But it is the only lunar theory I have examined which included all of the known data and accounted for all of them.”

He appeared to have finished. Lentz spoke up. “Suppose, captain, suppose we check your mathematics and find no flaw—what then?”

Harrington flung out his hands. “That’s what I came here to find out!”

ALTHOUGH Lentz had asked the question, Harrington directed the appeal to King. The superintendent looked up; his eyes met the astronomer’s, wavered and dropped again. “There’s nothing to be done,” he said dully, “nothing at all.”

Harrington stared at him in open amazement. “But good God, man!” he burst out. “Don’t you see it? That bomb has *got* to be disassembled—at once!”

“Take it easy, captain.” Lentz’s calm voice was a spray of cold water. “And don’t be too harsh on poor King—this worries him even more than it does you. What he means is this: we’re not faced with a problem in physics, but with a political and economic situation. Let’s put it this way: King can no more dump the bomb than a peasant with a vine-

yard on the slopes of Mount Vesuvius can abandon his holdings and pauperize his family simply because there will be an eruption some day.

“King doesn’t own that bomb out there; he’s only the custodian. If he dumps it against the wishes of the legal owners, they’ll simply oust him and put in someone more amenable. No, we have to convince the owners.”

“The president could do it,” suggested Harrington. “I could get to the president—”

“No doubt you could, through the navy department. And you might even convince him. But could he help much?”

“Why, of course he could. He’s the *president*!”

“Wait a minute. You’re director of the Naval Observatory; suppose you took a sledge hammer and tried to smash the big telescope—how far would you get?”

“Not very far,” Harrington conceded. “We guard the big fellow pretty closely.”

“Nor can the president act in an arbitrary manner,” Lentz persisted. “He’s not an unlimited monarch. If he shuts down this plant without due process of law, the Federal courts will tie him in knots. I admit that Congress isn’t helpless, but—would you like to try to give a congressional committee a course in the mechanics of infinitesimals?”

Harrington readily stipulated the point. “But there is another way,” he pointed out. “Congress is responsive to public opinion. What we need to do is to convince the public that the bomb is a menace to everybody. That could be done without ever trying to explain things in terms of higher mathematics.”

“Certainly it could,” Lentz agreed. “You could go on the air with it and scare everybody half to death. You

could create the damndest panic this slightly slug-nutty country has ever seen. No, thank you. I, for one, would rather have us all take the chance of being quietly killed than bring on a mass psychosis that would destroy the culture we are building up. I think one taste of the Crazy Years is enough."

"Well, then, what do *you* suggest?"

Lentz considered shortly, then answered: "All I see is a forlorn hope. We've got to work on the board of directors and try to beat some sense into their heads."

King, who had been following the discussion with attention in spite of his tired despondency, interjected a remark: "How would you go about that?"

"I don't know," Lentz admitted. "It will take some thinking. But it seems the most fruitful line of approach. If it doesn't work, we can always fall back on Harrington's notion of publicity—I don't insist that the world commit suicide to satisfy my criteria of evaluation."

Harrington glanced at his wrist watch—a bulky affair—and whistled. "Good heavens!" he exclaimed. "I forgot the time! I'm supposed officially to be at the Flagstaff Observatory."

King had automatically noted the time shown by the captain's watch as it was displayed. "But it can't be that late," he had objected. Harrington looked puzzled, then laughed.

"It isn't—not by two hours. We are in zone plus-seven; this shows zone plus-five—it's radio-synchronized with the master clock at Washington."

"Did you say radio-synchronized?"

"Yes. Clever, isn't it?" He held it out for inspection. "I call it a telechronometer; it's the only one of

its sort to date. My nephew designed it for me. He's a bright one, that boy. He'll go far. That is"—his face clouded, as if the little interlude had only served to emphasize the tragedy that hung over them—"if any of us live that long!"

A signal light glowed at King's desk, and Steinke's face showed on the communicator screen. King answered him, then said, "Your car is ready, Dr. Lentz."

"Let Captain Harrington have it."

"Then you're not going back to Chicago?"

"No. The situation has changed. If you want me, I'm stringing along."

THE FOLLOWING Friday, Steinke ushered Lentz into King's office. King looked almost happy as he shook hands. "When did you ground, doctor? I didn't expect you back for another hour or so."

"Just now. I hired a cab instead of waiting for the shuttle."

"Any luck?"

"None. The same answer they gave you: 'The company is assured by independent experts that Destry's mechanics is valid, and sees no reason to encourage an hysterical attitude among its employees.'"

King tapped on his desk top, his eyes unfocused. Then, hitching himself around to face Lentz directly, he said, "Do you suppose the chairman is right?"

"How?"

"Could the three of us—you, me and Harrington—have gone off the deep end—slipped mentally?"

"No."

"You're sure?"

"Certain. I looked up some independent experts of my own, not retained by the company, and had them check Harrington's work. It checks." Lentz purposely neglected

to mention that he had done so partly because he was none too sure of King's present mental stability.

King sat up briskly, reached out and stabbed a push button. "I am going to make one more try," he explained, "to see if I can't throw a scare into Dixon's thick head. Steinke," he said to the communicator, "get me Mr. Dixon on the screen."

"Yes, sir."

In about two minutes the telephone screen came to life and showed the features of Chairman Dixon. He was transmitting, not from his office, but from the board room of the company in Jersey City. "Yes?" he said. "What is it, superintendent?" His manner was "somehow both querulous and affable.

"Mr. Dixon," King began, "I've called to try to impress on you the seriousness of the company's action. I stake my scientific reputation that Harrington has proved completely that—"

"Oh, that? Mr. King, I thought you understood that that was a closed matter."

"But, Mr. Dixon—"

"Superintendent, please! If there were any possible legitimate cause to fear, do you think I would hesitate? I have children, you know, and grandchildren."

"That is just why—"

"We try to conduct the affairs of the company with reasonable wisdom and in the public interest. But we have other responsibilities, too. There are hundreds of thousands of little stockholders who expect us to show a reasonable return on their investment. You must not expect us to jettison a billion-dollar corporation just because you've taken up astrology! Moon theory!" He sniffed.

"Very well, Mr. Chairman." King's tone was stiff.

"Don't take it that way, Mr. King. I'm glad you called—the board has just adjourned a special meeting. They have decided to accept you for retirement—with full pay, of course."

"I did not apply for retirement!"

"I know, Mr. King, but the board feels that—"

"I understand. Good-by!"

"Mr. King—"

"Good-by!" He switched him off, and turned to Lentz. "—with full pay," he quoted, "which I can enjoy in any way that I like for the rest of my life—just as happy as a man in the death house!"

"Exactly," Lentz agreed. "Well, we've tried our way. I suppose we should call up Harrington now and let him try the political and publicity method."

"I suppose so," King seconded absent-mindedly. "Will you be leaving for Chicago now?"

"No," said Lentz. "No. . . . I think I will catch the shuttle for Los Angeles and take the evening rocket for the antipodes."

King looked surprised, but said nothing. Lentz answered the unspoken comment. "Perhaps some of us on the other side of the Earth will survive. I've done all that I can here. I would rather be a live sheepherder in Australia than a dead psychiatrist in Chicago."

King nodded vigorously. "That shows horse sense. For two cents, I'd dump the bomb now and go with you."

"Not horse sense, my friend—a horse will run back into a burning barn, which is exactly *not* what I plan to do. Why don't you do it and come along? If you did, it would help Harrington to scare 'em to death."

"I believe I will!"

STEINKE's face appeared again on the screen. "Harper and Erickson are here, chief."

"I'm busy."

"They are pretty urgent about seeing you."

"Oh . . . all right," King said in a tired voice, "show them in. It doesn't matter."

They breezed in, Harper in the van. He commenced talking at once, oblivious to the superintendent's morose preoccupation. "We've got it, chief, we've got it—and it all checks out to the umpteenth decimal!"

"You've got what? Speak English."

Harper grinned. He was enjoying his moment of triumph, and was stretching it out to savor it. "Chief, do you remember a few weeks back when I asked for an additional allotment—a special one without specifying how I was going to spend it?"

"Yes. Come on—get to the point."

"You kicked at first, but finally granted it. Remember? Well, we've got something to show for it, all tied up in pink ribbon. It's the greatest advance in radioactivity since Hahn split the nucleus. Atomic fuel, chief, atomic fuel, safe, concentrated, and controllable. Suitable for rockets, for power plants, for any damn thing you care to use it for."

King showed alert interest for the first time. "You mean a power source that doesn't require the bomb?"

"The bomb? Oh, no, I didn't say that. You use the bomb to make the fuel, then you use the fuel anywhere and anyhow you like, with something like ninety-two percent recovery of the energy of the bomb. But you could junk the mercury-steam sequence, if you wanted to."

King's first wild hope of a way

out of his dilemma was dashed; he subsided. "Go ahead. Tell me about it."

"Well—it's a matter of artificial radioactives. Just before I asked for that special research allotment, Erickson and I—Dr. Lentz had a finger in it, too—found two isotopes of a radioactive that seemed to be mutually antagonistic. That is, when we goosed 'em in the presence of each other they gave up their latent energy all at once—blew all to hell. The important point is, we were using just a gnat's whisker of mass of each—the reaction didn't require a big mass like the bomb to maintain it."

"I don't see," objected King, "how that could—"

"Neither do we, quite—but it works. We've kept it quiet until we were sure. We checked on what we had, and we found a dozen other fuels. Probably we'll be able to tailor-make fuels for any desired purpose. But here it is." Harper handed King a bound sheaf of typewritten notes which he had been carrying under his arm. "That's your copy. Look it over."

King started to do so. Lentz joined him, after a look that was a silent request for permission, which Erickson had answered with his only verbal contribution, "Sure, doc."

As KING read, the troubled feelings of an acutely harassed executive left him. His dominant personality took charge, that of the scientist. He enjoyed the controlled and cerebral ecstasy of the impersonal seeker for the elusive truth. The emotions felt in the throbbing thalamus were permitted only to form a sensuous obligato for the cold flame of cortical activity. For the time being, he was sane, more nearly completely

sane than most men ever achieve at any time.

For a long period there was only an occasional grunt, the clatter of turned pages, a nod of approval. At last he put it down.

"It's the stuff," he said. "You've done it, boys. It's great; I'm proud of you."

Erickson glowed a bright pink and swallowed. Harper's small, tense figure gave the ghost of a wriggle, reminiscent of a wire-haired terrier receiving approval. "That's fine, chief. We'd rather hear you say that than get the Nobel Prize."

"I think you'll probably get it. However"—the proud light in his eyes died down—"I'm not going to take any action in this matter."

"Why not, chief?" Harper's tone was bewildered.

"I'm being retired. My successor will take over in the near future; this is too big a matter to start just before a change in administration."

"*You being retired!* Blazes!"

"About the same reason I took you off the bomb—at least, the directors think so."

"But that's nonsense! You were right to take me off the bomb; I *was* getting jumpy. But you're another matter—we all depend on you."

"Thanks, Cal—but that's how it is; there's nothing to be done about it." He turned to Lentz. "I think this is the last ironical touch needed to make the whole thing pure farce," he observed bitterly. "This thing is big, bigger than we can guess at this stage—and I have to give it a miss."

"Well," Harper burst out, "I can think of something to do about it!" He strode over to King's desk and snatched up the manuscript. "Either you superintend the exploitation or the company can damn well get along without our discovery!" Erickson concurred belligerently.

"Wait a minute." Lentz had the floor. "Dr. Harper, have you already achieved a practical rocket fuel?"

"I said so. We've got it on hand now."

"An escape-speed fuel?" They understood his verbal shorthand—a fuel that would lift a rocket free of the Earth's gravitational pull.

"Sure. Why, you could take any of the Clipper rockets, refit them a trifle, and have breakfast on the Moon."

"Very well. Bear with me—" He obtained a sheet of paper from King and commenced to write. They watched in mystified impatience. He continued briskly for some minutes, hesitating only momentarily. Presently he stopped and spun the paper over to King. "Solve it!" he demanded.

King studied the paper. Lentz had assigned symbols to a great number of factors, some social, some psychological, some physical, some economic. He had thrown them together into a structural relationship, using the symbols of calculus of statement. King understood the paramathematical operations indicated by the symbols, but he was not as used to them as he was to the symbols and operations of mathematical physics. He plowed through the equations, moving his lips slightly in unconscious subvocalization.

He accepted a pencil from Lentz and completed the solution. It required several more lines, a few more equations, before the elements canceled out, or rearranged themselves, into a definite answer.

He stared at this answer while puzzlement gave way to dawning comprehension and delight.

He looked up. "Erickson! Har-

per!" he rapped out. "We will take your new fuel, refit a large rocket, install the bomb in it, and throw it into an orbit around the Earth, far out in space. There we will use it to make more fuel, safe fuel, for use on Earth, with the danger from the bomb itself limited to the operators actually on watch!"

There was no applause. It was not that sort of an idea; their minds were still struggling with the complex implications.

"But, chief," Harper finally managed, "how about your retirement? We're still not going to stand for it."

"Don't worry," King assured him. "It's all in there, implicit in those equations, you two, me, Lentz, the board of directors—and just what we all have to do to accomplish it."

"All except the matter of time," Lentz cautioned.

"Eh?"

"You'll note that elapsed time appears in your answer as an undetermined unknown."

"Yes . . . yes, of course. That's the chance we have to take. Let's get busy!"

CHAIRMAN DIXON called the board of directors to order. "This being a special meeting, we'll dispense with minutes and reports," he announced.

"As set forth in the call we have agreed to give the retiring superintendent three hours of our time."

"Mr. Chairman—"

"Yes, Mr. Thornton?"

"I thought we had settled that matter."

"We have, Mr. Thornton, but in view of Superintendent King's long and distinguished service, if he asks a hearing, we are honor bound to grant it. You have the floor, Dr. King."

King got up and stated briefly, "Dr. Lentz will speak for me." He sat down.

Lentz had to wait till coughing, throat clearing and scraping of chairs subsided. It was evident that the board resented the outsider.

Lentz ran quickly over the main points in the argument which contended that the bomb presented an intolerable danger anywhere on the face of the Earth. He moved on at once to the alternative proposal that the bomb should be located in a rocketship, an artificial moonlet flying in a free orbit around the Earth at a convenient distance—say, fifteen thousand miles—while secondary power stations on Earth burned a safe fuel manufactured by the bomb.

He announced the discovery of the



TRY THE
STAR
WAY TO
SHAVE!

Famous since 1880
STAR

STAR WORLD'S LARGEST SELLING SINGLE EDGE BLADE

4 for 10¢ 12 for 25¢

Harper-Erickson technique and dwelt on what it meant to them commercially. Each point was presented as persuasively as possible, with the full power of his engaging personality. Then he paused and waited for them to blow off steam.

They did. "Visionary—" "Unproved—" "No essential change in the situation—" The substance of it was that they were very happy to hear of the new fuel, but not particularly impressed by it. Perhaps in another twenty years, after it had been thoroughly tested and proved commercially, and provided enough uranium had been mined to build another bomb, they might consider setting up another power station outside the atmosphere. In the meantime there was no hurry.

Lentz patiently and politely dealt with their objections. He emphasized the increasing incidence of occupational psychoneurosis among the engineers and the grave danger to everyone near the bomb even under the orthodox theory. He reminded them of their insurance and indemnity-bond costs, and of the "squeeze" they paid State politicians.

Then he changed his tone and let them have it directly and brutally. "Gentlemen," he said, "we believe that we are fighting for our lives—our own lives, our families and every life on the globe. If you refuse this compromise, we will fight as fiercely and with as little regard for fair play as any cornered animal." With that he made his first move in attack.

It was quite simple. He offered for their inspection the outline of a propaganda campaign on a national scale, such as any major advertising firm could carry out as a matter of routine. It was complete to the last detail, television broadcasts, spot plugs, newspaper and magazine coverage with planted editorials, dummy

"citizens' committees" and—most important—a supporting whispering campaign and a letters-to-Congress organization. Every businessman there knew from experience how such things worked.

But its object was to stir up fear of the bomb and to direct that fear, not into panic, but into rage against the board of directors personally, and into a demand that the government take action to have the bomb removed to outer space.

"This is blackmail! We'll stop you!"

"I think not," Lentz replied gently. "You may be able to keep us out of some of the newspapers, but you can't stop the rest of it. You can't even keep us off the air—ask the Federal Communications Commission." It was true. Harrington had handled the political end and had performed his assignment well; the president was convinced.

Tempers were snapping on all sides; Dixon had to pound for order. "Dr. Lentz," he said, his own temper under taut control, "you plan to make every one of us appear a black-hearted scoundrel with no other thought than personal profit, even at the expense of the lives of others. You know that is not true; this is a simple difference of opinion as to what is wise."

"I did not say it was true," Lentz admitted blandly, "but you will admit that I can convince the public that you are deliberate villains. As to it being a difference of opinion—you are none of you atomic physicists; you are not entitled to hold opinions in this matter."

"As a matter of fact," he went on callously, "the only doubt in my mind is whether or not an enraged public will destroy your precious power plant before Congress has time

to exercise eminent domain and take it away from you!"

Before they had time to think up arguments in answer and ways of circumventing him, before their hot indignation had cooled and set as stubborn resistance, he offered his gambit. He produced another layout for a propaganda campaign—an entirely different sort.

THIS TIME the board of directors was to be built up, not torn down. All of the same techniques were to be used; behind-the-scenes feature articles with plenty of human interest would describe the functions of the company, describe it as a great public trust, administered by patriotic, unselfish statesmen of the business world. At the proper point in the campaign, the Harper-Erickson fuel would be announced, not as a semiaccidental result of the initiative of two employees, but as the long-expected end product of years of systematic research conducted under a fixed policy of the board of directors, a policy growing naturally out of their humane determination to remove forever the menace of explosion from even the sparsely settled Arizona desert.

No mention was to be made of the danger of complete, planet-embracing catastrophe.

Lentz discussed it. He dwelt on the appreciation that would be due them from a grateful world. He invited them to make a noble sacrifice and, with subtle misdirection, tempted them to think of themselves as heroes. He deliberately played on one of the most deep-rooted of simian instincts, the desire for approval from one's kind, deserved or not.

All the while he was playing for time, as he directed his attention from one hard case, one resistant

mind, to another. He soothed and he tickled and he played on personal foibles. For the benefit of the timorous and the devoted family men, he again painted a picture of the suffering, death and destruction that might result from their well-meant reliance on the unproved and highly questionable predictions of Destry's inathematics. Then he described in glowing detail a picture of a world free from worry but granted almost unlimited power, safe power from an invention which was theirs for this one small concession.

It worked. They did not reverse themselves all at once, but a committee was appointed to investigate the feasibility of the proposed spaceship power plant. By sheer brass Lentz suggested names for the committee and Dixon confirmed his nominations, not because he wished to, particularly, but because he was caught off guard and could not think of a reason to refuse without affronting those colleagues.

The impending retirement of King was not mentioned by either side. Privately, Lentz felt sure that it never would be mentioned.

IT WORKED, but there was left much to do. For the first few days after the victory in committee, King felt much elated by the prospect of an early release from the soul-killing worry. He was buoyed up by pleasant demands of manifold new administrative duties. Harper and Erickson were detached to Goddard Field to collaborate with the rocket engineers there in design of firing chambers, nozzles, fuel stowage, fuel metering and the like. A schedule had to be worked out with the business office to permit as much power of the bomb as possible to be diverted to making atomic fuel, and a giant combustion chamber for atomic

fuel had to be designed and ordered to replace the bomb itself during the interim between the time it was shut down on Earth and the later time when sufficient local, smaller plants could be built to carry the commercial load. He was busy.

When the first activity had died down and they were settled in a new routine, pending the shutting down of the bomb and its removal to outer space, King suffered an emotional reaction. There was, by then, nothing to do but wait, and tend the bomb, until the crew at Goddard Field smoothed out the bugs and produced a space-worthy rocketship.

They ran into difficulties, overcame them, and came across more difficulties. They had never used such high reaction velocities; it took many trials to find a nozzle shape that would give reasonably high efficiency. When that was solved, and success seemed in sight, the jets burned out on a time-trial ground test. They were stalemated for weeks over that hitch.

Back at the power plant Superintendent King could do nothing but chew his nails and wait. He had not even the release of running over to Goddard Field to watch the progress of the research, for, urgently as he desired to, he felt an even stronger, an overpowering compulsion to watch over the bomb more lest it—heartbreakingly!—blow up at the last minute.

He took to hanging around the control room. He had to stop that; his unease communicated itself to his watch engineers; two of them cracked up in a single day—one of them on watch.

He must face the fact—there had been a grave upswing in psychoneurosis among his engineers since the period of watchful waiting had commenced. At first, they had tried to

keep the essential facts of the plan a close secret, but it had leaked out, perhaps through some member of the investigating committee. He admitted to himself now that it had been a mistake ever to try to keep it secret—Lentz had advised against it, and the engineers not actually engaged in the change-over were bound to know that something was up.

He took all of the engineers into confidence at last, under oath of secrecy. That had helped for a week or more, a week in which they were all given a spiritual lift by the knowledge, as he had been. Then it had worn off, the reaction had set in, and the psychological observers had started disqualifying engineers for duty almost daily. They were even reporting each other as mentally unstable with great frequency; he might even be faced with a shortage of psychiatrists if that kept up, he thought to himself with bitter amusement. His engineers were already standing four hours in every sixteen. If one more dropped out, he'd put himself on watch. That would be a relief, to tell himself the truth.

Somehow, some of the civilians around about and the nontechnical employees were catching on to the secret. That mustn't go on—if it spread any farther there might be a nation-wide panic. But how the hell could he stop it? He couldn't.

He turned over in bed, rearranged his pillow, and tried once more to get to sleep. No soap. His head ached, his eyes were balls of pain, and his brain was a ceaseless grind of useless, repetitive activity, like a disk recording stuck in one groove.

God! This was unbearable! He wondered if he were cracking up—if he already had cracked up. This was worse, many times worse, than the old routine when he had simply acknowledged the danger and tried

to forget it as much as possible. Not that the bomb was any different—it was this five-minutes-to-armistice feeling, this waiting for the curtain to go up, this race against time with nothing to do to help.

He sat up, switched on his bed lamp, and looked at the clock. Three thirty. Not so good. He got up, went into his bathroom, and dissolved a sleeping powder in a glass of whiskey and water, half and half. He gulped it down and went back to bed. Presently he dozed off.

HE was running, fleeing down a long corridor. At the end lay safety—he knew that, but he was so utterly exhausted that he doubted his ability to finish the race. The thing pursuing him was catching up; he forced his leaden, aching legs into greater activity. The thing behind him increased its pace, and actually touched him. His heart stopped, then pounded again. He became aware that he was screaming, shrieking in mortal terror.

But he had to reach the end of that corridor; more depended on it than just himself. He had to. He had to! *He had to!*

Then the sound hit him, and he realized that he had lost, realized it with utter despair and utter, bitter defeat. He had failed; the bomb had blown up.

THE SOUND was the alarm going off; it was seven o'clock. His pajamas were soaked, dripping with sweat, and his heart still pounded. Every ragged nerve throughout his body screamed for release. It would take more than a cold shower to cure this case of the shakes.

He got to the office before the janitor was out of it. He sat there, doing nothing, until Lentz walked in on him, two hours later. The psy-

chiatrist came in just as he was taking two small tablets from a box in his desk.

"Easy . . . easy, old man," Lentz said in a slow voice. "What have you there?" He came around and gently took possession of the box.

"Just a sedative."

Lentz studied the inscription on the cover. "How many have you had today?"

"Just two, so far."

"You don't need a sedative; you need a walk in the fresh air. Come, take one with me."

"You're a fine one to talk—you're smoking a cigarette that isn't lighted!"

"Me? Why, so I am! We both need that walk. Come."

HARPER arrived less than ten minutes after they had left the office. Steinke was not in the outer office. He walked on through and pounded on the door of King's private office, then waited with the man who accompanied him—a hard young chap with an easy confidence to his bearing. Steinke let them in.

Harper brushed on past him with a casual greeting, then checked himself when he saw that there was no one else inside.

"Where's the chief?" he demanded.

"Gone out. Should be back soon."

"I'll wait. Oh—Steinke, this is Greene. Greene—Steinke."

The two shook hands. "What brings you back, Cal?" Steinke asked, turning back to Harper.

"Well . . . I guess it's all right to tell you—"

The communicator screen flashed into sudden activity, and cut him short. A face filled most of the frame. It was apparently too close to the pickup, as it was badly out of

focus. "Superintendent!" it yelled in an agonized voice. "The bomb—"

A shadow flashed across the screen, they heard a dull *smack*, and the face slid out of the screen. As it fell it revealed the control room behind it. Someone was down on the floor plates, a nameless heap. Another figure ran across the field of pickup and disappeared.

Harper snapped into action first. "That was Silard!" he shouted, "in the control room! Come on, Steinke!" He was already in motion himself.

Steinke went dead-white, but hesitated only an unmeasurable instant. He pounded sharp on Harper's heels. Greene followed without invitation, in a steady run that kept easy pace with them.

They had to wait for a capsule to unload at the tube station. Then all three of them tried to crowd into a two-passenger capsule. It refused to start, and moments were lost before Greene piled out and claimed another car.

The four-minute trip at heavy acceleration seemed an interminable crawl. Harper was convinced that the system had broken down, when the familiar click and sigh announced their arrival at the station under the bomb. They jammed each other trying to get out at the same time.

The lift was up; they did not wait for it. That was unwise; they gained no time by it, and arrived at the control level out of breath. Nevertheless, they speeded up when they reached the top, zigzagged frantically around the outer shield, and burst into the control room.

The limp figure was still on the floor, and another, also inert, was near it. The second's helmet was missing.

The third figure was bending over the trigger. He looked up as they came in, and charged them. They

hit him together, and all three went down. It was two to one, but they got in each other's way. The man's heavy armor protected him from the force of their blows. He fought with senseless, savage violence.

Harper felt a bright, sharp pain; his right arm went limp and useless. The armored figure was struggling free of them.

There was a shout from somewhere behind them, "Hold still!"

Harper saw a flash with the corner of one eye, a deafening crack hurried on top of it, and re-echoed painfully in the restricted space.

The armored figure dropped back to his knees, balanced there, and then fell heavily on his face. Greene stood in the entrance, a service pistol balanced in his hand.

Harper got up and went over to the trigger. He tried to reduce the dampening adjustment, but his right hand wouldn't carry out his orders, and his left was too clumsy. "Steinke," he called, "come here! Take over."

Steinke hurried up, nodded as he glanced at the readings, and set busily to work.

IT WAS THUS that King found them when he bolted in a very few minutes later.

"Harper!" he shouted, while his quick glance was still taking in the situation. "What's happened?"

Harper told him briefly. He nodded. "I saw the tail end of the fight from my office—Steinke!" He seemed to grasp for the first time who was on the trigger. "He can't manage the controls—" He hurried toward him.

Steinke looked up at his approach. "Chief!" he called out. "Chief! *I've got my mathematics back!*"

King looked bewildered, then nodded vaguely, and let him be. He

turned back to Harper. "How does it happen you're here?"

"Me? I'm here to report—we've done it, chief!"

"Eh?"

"We've finished; it's all done. Erickson stayed behind to complete the power-plant installation on the big ship. I came over in the ship we'll use to shuttle between Earth and the big ship, the power plant. Four minutes from Goddard Field to here in her. That's the pilot over there." He pointed to the door, where Greene's solid form partially hid Lentz.

"Wait a minute. You say that everything is ready to install the bomb in the ship? You're sure?"

"Positive. The big ship has already flown with our fuel—longer and faster than she will have to fly

to reach station in her orbit; I was in it—out in space, chief! We're all set, six ways from zero."

King stared at the dumping switch, mounted behind glass at the top of the instrument board. "There's fuel enough," he said softly, as if he were alone and speaking only to himself; "there's been fuel enough for weeks."

He walked swiftly over to the switch, smashed the glass with his fist, and pulled it.

The room rumbled and shivered as two and a half tons of molten, massive metal, heavier than gold, coursed down channels, struck against baffles, split into a dozen dozen streams, and plunged to rest in leaden receivers—to rest, safe and harmless, until it should be reassembled far out in space.

THE END.

BACK COPIES AVAILABLE

Back issues of Astounding Science-Fiction are still available, in many cases. Copies from October, 1939, to date can be supplied at 20c a copy.

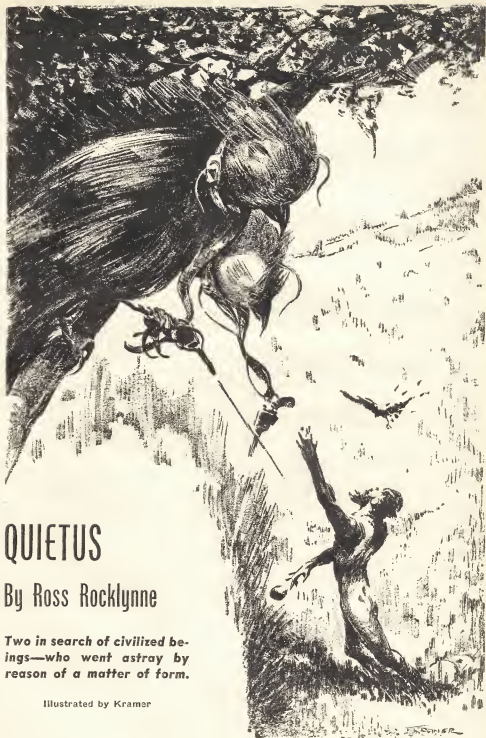
The heavy demand for older issues has exhausted the supply of many numbers, particularly those earlier than 1937. Where available, these issues more than one year old will be supplied at 30c a copy. (The extra cost is to cover warehouse storage. Storing several hundred copies each of a magazine that comes out once a month takes space.)

No issues earlier than 1937 can be supplied; several later numbers are sold out. In particular, those issues containing "Galactic Patrol" are gone.

Which suggests that if you want, but missed, "Groy Lensmon," you get it while it is on hand. The four issues were the October, November, December, 1939, and the January, 1940, issues.

Apply to:

Subscription Department
Street & Smith Publications, Inc.
79 Seventh Ave., New York, N. Y.



QUIETUS

By Ross Rocklynne

Two in search of civilized beings—who went astray by reason of a matter of form.

Illustrated by Kramer

THE creatures from Alcon saw from the first that Earth, as a planet, was practically dead; dead in the sense that it had given birth to life, and was responsible, indirectly, for its almost complete extinction.

"This type of planet is the most distressing," said Tark, absently smoothing down the brilliantly colored feathers of his left wing. "I can stand the dark, barren worlds which never have, and probably never will, hold life. But these that have been killed by some celestial catastrophe! Think of what great things might have come from their inhabitants."

As he spoke thus to his mate, Vascar, he was marking down in a book the position of this planet, its general appearance from space, and the number and kind of satellites it supported.

Vascar, sitting at the controls, both her claws, and her vestigial hands at work, guided the spherical ship at slowly decreasing speed toward the planet Earth. A thousand miles above it, she set the craft into an orbital motion, and then proceeded to study the planet, Tark setting the account into his book, for later insertion into the Astronomical Archives of Alcon.

"Evidently," mused Vascar, her brilliant, unblinking eyes looking at the planet through a transparent section above the control board, "some large meteor, or an errant asteroid—that seems most likely—must have struck this specimen a terrible blow. Look at those great, gaping cracks that run from pole to pole, Tark. It looks as if volcanic eruptions are still taking place, too. At any rate, the whole planet seems entirely denuded—except for that single, short strip of green we saw as we came in."

Tark nodded. He was truly a bird, for in the evolutionary race on his planet, distant uncounted light-years, his stock had won out over the others. His wings were short, true, and in another thousand years would be too short for flight, save in a dense atmosphere; but his head was large, and his eyes, red, small, set close together, showed intelligence and a kind benevolence. He and Vascar had left Alcon, their planet, a good many years ago; but they were on their way back now. Their outward-bound trip had taken them many light-years north of the Solar System; but on the way back, they had decided to make it one of the stop-off points in their zigzag course. Probably their greatest interest in all this long cruise was in the discovery of planets—they were indeed few. And that pleasure might even be secondary to the discovery of life. To find a planet that had almost entirely died was, conversely, distressing. Their interest in the planet Earth was, because of this, a wistful one.

The ship made the slow circuit of Earth—the planet was a hodge-podge of tumbled, churned mountains; of abysmal, frightfully long cracks exuding unholy vapors; of volcanoes that threw their fires and hot liquid rocks far into the sky; of vast oceans disturbed from the ocean bed by cataclysmic eruptions. And of life they saw nothing save a single strip of green perhaps a thousand miles long, a hundred wide, in the Western Hemisphere.

"I don't think we'll find intelligent life, though," Tark said pessimistically. "This planet was given a terrific blow—I wouldn't be surprised if her rotation period was cut down considerably in a single instant. Such a charge would be unsupportable. Whole cities would literally be

snapped away from their foundations—churned, ground to dust. The intelligent creatures who built them would die by the millions—the billions—in that holocaust; and whatever destruction was left uncomplete would be finished up by the appearance of volcanoes and faults in the crust of the planet."

Vascar reminded him, "Remember, where there's vegetation, even as little as evidenced by that single strip down there, there must be some kind of animal life."

Tark ruffled his wings in a shrug. "I doubt it. The plants would get all the carbon dioxide they needed from volcanoes—animal life wouldn't have to exist. Still, let's take a look. Don't worry, I'm hoping there's intelligent life, too. If there is, it will doubtless need some help if it is to survive. Which ties in with our aims, for that is our principal purpose on this expedition—to discover intelligent life, and, wherever possible, to give it what help we can, if it needs help."

Vascar's vestigial hands worked the controls, and the ship dropped leisurely downward toward the green strip.

A RABBIT darted out of the underbrush—Tommy leaped at it with the speed and dexterity of a thoroughly wild animal. His powerful hands wrapped around the creature—its struggles ceased as its vertebra was snapped. Tommy squatted, tore the skin off the creature, and proceeded to eat great mouthfuls of the still warm flesh.

Blacky cawed harshly, squawked, and his untidy form came flashing down through the air to land precariously on Tommy's shoulder. Tommy went on eating, while the crow fluttered its wings, smoothed

them out, and settled down to a restless somnolence. The quiet of the scrub forest, save for the cries and sounds of movement of birds and small animals moving through the forest, settled down about Tommy as he ate. "Tommy" was what he called himself. A long time ago, he remembered, there used to be a great many people in the world—perhaps a hundred—many of whom, and particularly two people whom he had called Mom and Pop, had called him by that name. They were gone now, and the others with them. Exactly where they went, Tommy did not know. But the world had rocked one night—it was the night Tommy ran away from home, with Blacky riding on his shoulder—and when Tommy came out of the cave where he had been sleeping, all was in flames, and the city on the horizon had fallen so that it was nothing but a huge pile of dust—but in the end it had not mattered to Tommy. Of course, he was lonesome, terrified, at first, but he got over that. He continued to live, eating, drinking, sleeping, walking endlessly; and Blacky, his talking crow, was good company. Blacky was smart. He could speak every word that Tommy knew, and a good many others that he didn't. Tommy was not Blacky's first owner.

But though he had been happy, the last year had brought the recurrence of a strange feeling that had plagued him off and on, but never so strongly as now. A strange, terrible hunger was settling on him. Hunger? He knew this sensation. He had forthwith slain a wild dog, and eaten of the meat. He saw then that it was not a hunger of the belly. It was a hunger of the mind, and it was all the worse because he could not know what it was. He had come to his feet, restless, looking into the

tangled depths of the second growth forest.

"Hungry," he had said, and his shoulders shook and tears coursed out of his eyes, and he sat down on the ground and sobbed without trying to stop himself, for he had never been told that to weep was unmanly. What was it he wanted?

He had everything there was all to himself. Southward in winter, northward in summer, eating of berries and small animals as he went, and Blacky to talk to and Blacky to talk the same words back at him. This was the natural life—he had lived it ever since the world went bang. But still he cried, and felt a panic growing in his stomach, and he didn't know what it was he was afraid of, or longed for, whichever it was. He was twenty-one years old. Tears were natural to him, to be indulged in whenever he felt like it. Before the world went bang—there were some things he remembered—the creature whom he called Mom generally put her arms around him and merely said, "It's all right, Tommy, it's all right."

So on that occasion, he arose from the ground and said, "It's all right, Tommy, it's all right."

Blacky, he with the split tongue, said harshly, as was his wont, "It's all right, Tommy, it's all right! I tell you, the price of wheat is going down!"

Blacky, the smartest crow anybody had—why did he say that? There wasn't anybody else, and there weren't any more crows—helped a lot. He not only knew all the words and sentences that Tommy knew, but he knew others that Tommy could never understand because he didn't know where they came from, or what they referred to. And in addition to all that, Blacky had the

ability to anticipate what Tommy said, and frequently took whole words and sentences right out of Tommy's mouth.

TOMMY finished eating his rabbit, and threw the skin aside, and sat quite still, a peculiarly blank look in his eyes. The strange hunger was on him again. He looked off across the lush plain of grasses that stretched away, searching into the distance, toward where the Sun was setting. He looked to left and right. He drew himself softly to his feet, and peered into the shadows of the forest behind him. His heavily bearded lips began to tremble, and the tears started from his eyes again. He turned and stumbled from the forest, blinded.

Blacky clutched at Tommy's broad shoulder, and rode him, and a split second before Tommy, said, "It's all right, Tommy, it's all right."

Tommy said the words angrily to himself, and blinked the tears away.

He was a little bit tired. The Sun was setting, and night would soon come. But it wasn't that that made him tired. It was a weariness of the mind, a feeling of futility, for, whatever it was he wanted, he could never, never find it, because he would not know where he should look for it.

His bare foot trampled on something wet—he stopped and looked at the ground. He stooped and picked up the skin of a recently killed rabbit. He turned it over and over in his hands, frowning. This was not an animal he had killed, certainly—the skin had been taken off in a different way. Someone else—no! But his shoulders began to shake with a wild excitement. Someone else? No, it couldn't be! There



"CASH" GORMAN

the Wizard of Odds

would bet that Georgia would go Republican—if the odds were right.

"Cash," a young man of ideas, prefers to live by his wits. His chief diversion is to allow himself to be taken for swindlers' bait and then swindle the swindler.

"Cash" is an adventurer in money. When thrown into contact with crooks who carry and use guns he frowns on the practice. "Bullets," defines "Cash," "are for people without brains."

In the first issue of his new magazine, THE WIZARD, "Cash" Gorman sinks \$135,000 into a helium well offered him by Nazi agents, and then sells the well back to them for two million—after a series of thrilling adventures, proving the power of Yankee ingenuity and Yankee money.

It's a glorious, high-action story, and with the four other tales it makes a wizard of this issue of

THE WIZARD

NOW ON SALE 10c A COPY

was no one—there could be no one—could there? The skin dropped from his nerveless fingers as he saw a single footprint not far ahead of him. He stooped over it, examining, and knew again that he had not done this, either. And certainly it could be no other animal than a man!

It was a small footprint at which he stared, as if a child, or an undersized man might have stepped in the soft humus. Suddenly he raised his head. He had definitely heard the crackling of a twig, not more than forty feet away, certainly. His eyes stared ahead through the gathering dusk. Something looking back at him? Yes! Something there in the bushes that was not an animal!

"No noise, Blacky," he whispered, and forgot Blacky's general response to that command.

"No noise, Blacky!" the big, ugly bird blasted out. "No noise, Blacky! Well, fer cryin' out loud!"

Blacky uttered a scared squawk as Tommy leaped ahead, a snarl contorting his features, and flapped from his master's shoulder. For several minutes Tommy ran after the vanishing figure, with all the strength and agility of his singularly powerful legs. But whoever—or whatever—it was that fled him, outdistanced him easily, and Tommy had to stop at last, panting. Then he stooped, and picked up a handful of pebbles and hurled them at the squawking bird. A single tail feather fell to earth as Blacky swooped away.

"Told you not to make noise," Tommy snarled, and the tears started to run again. The hunger was starting up in his mind again, too! He sat down on a log, and put his chin in his palms, while his tears flowed. Blacky came flapping through the air, almost like a shadow—it was getting dark. The bird tentatively settled on his shoulder, cau-

tiously flapped away again and then came back.

Tommy turned his head and looked at it bitterly, and then turned away, and groaned.

"It's all your fault, Blacky!"

"It's all your fault," the bird said. "Oh, Tommy, I could spank you! I get so exasperated!"

Sitting there, Tommy tried to learn exactly what he had seen. He had been sure it was a human figure, just like himself, only different. Different! It had been smaller, had seemed to possess a slender grace—it was impossible! Every time he thought of it, the hunger in his mind raged!

He jumped to his feet, his fists clenched. This hunger had been in him too long! He must find out what caused it—he must find her—why did the word *her* come to his mind? Suddenly, he was flooded with a host of childhood remembrances.

"It was a girl!" he gasped. "Oh, Tommy must want a girl!"

The thought was so utterly new that it left him stunned; but the thought grew. He must find her, if it took him all the rest of his life! His chest deepened, his muscles swelled, and a new light came into his blue eyes. Southward in winter, northward in summer—eating—sleeping—truly, there was nothing in such a life. Now he felt the strength of a purpose swelling up in him. He threw himself to the ground and slept; and Blacky flapped to the limb of a tree, inserted his head beneath a wing, and slept also. Perhaps, in the last ten or fifteen years, he also had wanted a mate, but probably he had long ago given up hope—for, it seemed, there were no more crows left in the world. Anyway, Blacky was very old, perhaps twice as old

as Tommy; he was merely content to live.

TARK AND VASCAR sent their spherical ship lightly plummeting above the green strip—it proved to be vegetation, just as they had supposed. Either one or the other kept constant watch of the ground below—they discovered nothing that might conceivably be classed as intelligent life. Insects they found, and decided that they worked entirely by instinct; small animals, rabbits, squirrels, rats, raccoons, otters, opossums, and large animals, deers, horses, sheep, cattle, pigs, dogs, they found to be just that—animals, and nothing more.

"Looks as if it was all killed off, Vascar," said Tark, "and not so long ago at that, judging by the fact that this forest must have grown entirely in the last few years."

Vascar agreed; she suggested they put the ship down for a few days and rest.

"It would be wonderful if we could find intelligent life after all," she said wistfully. "Think what a great triumph it would be if we were the ones to start the last members of that race on the upward trail again. Anyway," she added, "I think this atmosphere is dense enough for us to fly in."

He laughed—a trilling sound. "You've been looking for such an atmosphere for years. But I think you're right about this one. Put the ship down there, Vascar—looks like a good spot."

FOR FIVE DAYS Tommy followed the trail of the girl with a grim determination. He knew now that it was a woman; perhaps—indeed, very probably—the only one left alive. He had only the vaguest of

ideas of why he wanted her—he thought it was for human companionship, that alone. At any rate, he felt that this terrible hunger in him—he could give it no other word—would be allayed when he caught up with her.

She was fleeing him, and staying just near enough to him to make him continue the chase, he knew that with a fierce exultation. And somehow her actions seemed right and proper. Twice he had seen her, once on the crest of a ridge, once as she swam a river. Both times she had easily outdistanced him. But by cross-hatching, he picked up her trail again—a bent twig or weed, a footprint, the skin of a dead rabbit.

Once, at night, he had the impression that she crept up close, and looked at him curiously, perhaps with the same great longing that he felt. He could not be sure. But he knew that very soon now she would be his—and perhaps she would be glad of it.

Once he heard a terrible moaning, high up in the air. He looked upward. Blacky uttered a surprised squawk. A large, spherical thing was darting overhead.

"I wonder what that is," Blacky squawked.

"I wonder what that is," said Tommy, feeling a faint fear. "There ain't nothin' like that in the yard."

He watched as the spaceship disappeared from sight. Then, with the unquestioning attitude of the savage, he dismissed the matter from his mind, and took up his tantalizing trail again.

"Better watch out, Tommy," the bird cawed.

"Better watch out, Tommy," Tommy muttered to himself. He only vaguely heard Blacky—Blacky

always anticipated what Tommy was going to say, because he had known Tommy so long.

The river was wide, swirling, muddy, primeval in its surge of restless strength. Tommy stood on the bank, and looked out over the waters—suddenly his breath souged from his lungs.

"It's her!" he gasped. "It's her, Blacky! She's drownin'!"

No time to waste in thought—a figure truly struggled against the push of the treacherous waters, seemingly went under. Tommy dived cleanly, and Blacky spread his wings at the last instant and escaped a bath. He saw his master disappear beneath the swirling waters, saw him emerge, strike out with singularly powerful arms, slightly upstream, fighting every inch of the way. Blacky hovered over the waters, cawing frantically, and screaming.

"Tommy, I could spank you! I could spank you! I get so exasperated! You wait till your father comes home!"

A log was coming downstream. Tommy saw it coming, but knew he'd escape it. He struck out, paid no more attention to it. The log came down with a rush, and would have missed him had it not suddenly swung broadside on. It clipped the swimming man on the side of the head. Tommy went under, threshing feebly, barely conscious, his limbs like leaden bars. That seemed to go on for a very long time. He seemed to be breathing water. Then something grabbed hold of his long black hair—

When he awoke, he was lying on his back, and he was staring into her eyes. Something in Tommy's stomach fell out—perhaps the hunger was going. He came to his feet, staring at her, his eyes blazing. She

stood only about twenty feet away from him. There was something pleasing about her, the slimness of her arms, the roundness of her hips, the strangeness of her body, her large, startled, timid eyes, the mass of ebon hair that fell below her hips. He started toward her. She gazed at him as if in a trance.

Blacky came flapping mournfully across the river. He was making no sound, but the girl must have been frightened as he landed on Tommy's shoulder. She tensed, and was away like a rabbit. Tommy went after her in long, loping bounds, but his foot caught in a tangle of dead grass, and he plummeted head foremost to the ground.

The other vanished over a rise of ground.

He arose again, and knew no disappointment that he had again lost her. He knew now that it was only her timidity, the timidity of a wild creature, that made her flee him. He started off again, for now that he knew what the hunger was, it seemed worse than ever.

THE AIR of this planet was deliciously breathable, and was the nearest thing to their own atmosphere that Tark and Vascar had encountered.

Vascar ruffled her brilliant plumage, and spread her wings, flapping them. Tark watched her, as she laughed at him in her own way, and then made a few short, running jumps and took off. She spiraled, cleared down to him,

"Come on up. The air's fine, Tark."

Tark considered. "All right," he conceded, "but wait until I get a couple of guns."

"I can't imagine why," Vascar called down; but nevertheless, as

they rose higher and higher above the second growth forest, each had a belt strapped loosely around the neck, carrying a weapon similar to a pistol.

"I can't help but hope we run into some kind of intelligent life," said Vascar. "This is really a lovely planet. In time the volcanoes will die down, and vegetation will spread all over. It's a shame that the planet has to go to waste."

"We could stay and colonize it," Tark suggested rakishly.

"Oh, not I. I like Alcon too well for that, and the sooner we get back there, the better— Look! Tark! Down there!"

Tark looked, caught sight of a medium large animal moving through the underbrush. He dropped a little lower. And then rose again.

"It's nothing," he said. "An animal, somewhat larger than the majority we've seen—probably the last of its kind. From the looks of it, I'd say it wasn't particularly pleasant on the eyes. Its skin shows— Oh, now I see what you mean, Vascar!"

This time he was really interested as he dropped lower, and a strange excitement throbbed through his veins. Could it be that they were going to discover intelligent life after all—perhaps the last of its kind?

It was indeed an exciting sight the two bird-creatures from another planet saw. They flapped slowly above and a number of yards behind the unsuspecting upright beast, that moved swiftly through the forest, a black creature not unlike themselves in general structure riding its shoulder.

"It must mean intelligence!" Vascar whispered excitedly, her brilliant red eyes glowing with interest. "One of the first requisites of intelli-

IF

there'd never been an American Revolution—or

IF the Vikings had conquered Britain, or—

IF Leif Ericson instead of Columbus had started settling America—

● It would have been a different world. But—maybe, somewhere beyond our present ken, those different worlds exist. Then—

Allister Parks, would-be D. A. of New York, was snatched into one of those “IF” worlds by a dirty political deal. That was a mistake of the dirty-dealers. Because Parks decided that, if they wanted dirty politics, by the Lord Harry, they were gonna get it!

A lovely yarn of a cockeyed world and a very angry politician on a rampage! Read “THE WHEELS OF IF” by L. Sprague de Camp

IN THE OCTOBER

UNKNOWN

gent creatures is to put animals lower in the scale of evolution to work as beasts of burden and transportation.”

“Wait awhile,” cautioned Tark, “before you make any irrational conclusions. After all, there are creatures of different species which live together in friendship. Perhaps the creature which looks so much like us keeps the other’s skin and hair free of vermin. And perhaps the other way around, too.”

“I don’t think so,” insisted his mate. “Tark, the bird-creature is riding the shoulder of the beast. Perhaps that means its race is so old, and has used this means of transportation for so long, that its wings have atrophied. That would almost certainly mean intelligence. It’s talking now—you can hear it. It’s probably telling its beast to stop—there, it has stopped!”

“Its voice is not so melodious,” said Tark dryly.

She looked at him reprovingly; the tips of their flapping wings were almost touching.

“That isn’t like you, Tark. You know very well that one of our rules is not to place intelligence on creatures who seem like ourselves, and neglect others while we do so. Its harsh voice proves nothing—to one of its race, if there are any left, its voice may be pleasing in the extreme. At any rate, it ordered the large beast of burden to stop—you saw that.”

“Well, perhaps,” conceded Tark.

THEY continued to wing their slow way after the perplexing duo, following slightly behind, skimming the tops of trees. They saw the white beast stop, and place its paws on its hips. Vascar, listening very closely, because she was anxious to gain proof of her contention, heard the bird-creature say,

“Now what, Blacky?” and also

the featherless beast repeat the same words: "Now what, Blacky?"

"There's your proof," said Vascar excitedly. "Evidently the white beast is highly imitative. Did you hear it repeat what its master said?"

Tark said uneasily, "I wouldn't jump to conclusions, just from a hasty survey like this. I admit that, so far, all the proof points to the bird. It seems truly intelligent; or at least more intelligent than the other. But you must bear in mind that we are naturally prejudiced in favor of the bird—it may not be intelligent at all. As I said, they may merely be friends in the sense that animals of different species are friends."

Vascar made a scornful sound.

"Well, let's get goin', Blacky," she heard the bird say; and heard the white, upright beast repeat the strange, alien words. The white beast started off again, traveling very stealthily, making not the least amount of noise. Again Vascar called this quality to the attention of her skeptical mate—such stealth was the mark of the animal, certainly not of the intelligent creature.

"We should be certain of it now," she insisted. "I think we ought to get in touch with the bird. Remember, Tark, that our primary purpose on this expedition is to give what help we can to the intelligent races of the planets we visit. What creature could be more in need of help than the bird-creature down there? It is evidently the last of its kind. At least, we could make the effort of saving it from a life of sheer boredom; it would probably leap at the chance to hold converse with intelligent creatures. Certainly it gets no pleasure from the company of dumb beasts."

But Tark shook his handsome, red-plumed head worriedly.

"I would prefer," he said uneasily, "first to investigate the creature you are so sure is a beast of burden. There is a chance—though, I admit, a farfetched one—that it is the intelligent creature, and not the other."

But Vascar did not hear him. All her feminine instincts had gone out in pity to the seemingly intelligent bird that rode Tommy's broad shoulder. And so intent were she and Tark on the duo, that they did not see, less than a hundred yards ahead, that another creature, smaller in form, more graceful, but indubitably the same species as the white-skinned, unfeathered beast, was slinking softly through the underbrush, now and anon casting indecisive glances behind her toward him who pursued her. He was out of sight, but she could hear—

TOMMY slunk ahead, his breath coming fast; for the trail was very strong, and his keen ears picked up the sounds of footsteps ahead. The chase was surely over—his terrible hunger was about to end! He felt wildly exhilarated. Instincts were telling him much that his experience could not. He and this girl were the last of mankind. Something told him that now mankind would rise again—yet he did not know why. He slunk ahead, Blacky on his shoulder, all unaware of the two brilliantly colored denizens of another planet who followed above and behind him. But Blacky was not so easy of mind. His neck feathers were standing erect. Nervousness made him raise his wings up from his body—perhaps he heard the soft swish of large-winged creatures, beating the air behind; and though all birds of prey

had been dead these last fifteen years, the old fear rose up.

Tommy glued himself to a tree, on the edge of a clearing. His breath escaped from his lungs as he caught a glimpse of a white, unclothed figure. It was she! She was looking back at him. She was tired of running. She was ready, glad to give up. Tommy experienced a dizzy elation. He stepped forth into the clearing, and slowly, very slowly, holding her large, dark eyes with his, started toward her. The slightest swift motion, the slightest untoward sound, and she would be gone. Her whole body was poised on the balls of her feet. She was not at all sure whether she should be afraid of him or not.

Behind him, the two feathered creatures from another planet, settled slowly into a tree, and watched. Blacky certainly did not hear them come to rest—what he must have noticed was that the beat of wings, nagging at the back of his mind, had disappeared. It was enough.

"No noise, Blacky!" the bird screamed affrightedly, and flung himself into the air and forward, a bundle of ebon feathers with tattered wings outspread, as it darted across the clearing. For the third time, it was Blacky who scared her, for again she was gone, and had lost herself to sight even before Tommy could move.

"Come back!" Tommy shouted ragingly. "I ain't gonna hurt you!" He ran after her full speed, tears streaming down his face, tears of rage and heartbreak at the same time. But already he knew it was useless! He stopped suddenly, on the edge of the clearing, and sobbing to himself, caught sight of Blacky, high above the ground, cawing piercingly, warningly. Tommy

stooped and picked up a handful of pebbles. With deadly, murderous intent he threw them at the bird. It soared and swooped in the air—twice it was hit glancingly.

"It's all your fault, Blacky!" Tommy raged. He picked up a rock the size of his fist. He started to throw it, but did not. A tiny, sharp sound bit through the air. Tommy pitched forward. He did not make the slightest twitching motion to show that he had bridged the gap between life and death. He did not know that Blacky swooped down and landed on his chest; and then flung himself upward, crying, "Oh, Tommy, I could spank you!" He did not see the girl come into the clearing and stoop over him; and did not see the tears that began to gush from her eyes, or hear the sobs that racked her body. But Tark saw.

TARK WRESTED the weapon from Vascar with a trill of rage.

"Why did you do that?" he cried. He threw the weapon from him as far as it would go. "You've done a terrible thing, Vascar!"

Vascar looked at him in amazement. "It was only a beast, Tark," she protested. "It was trying to kill its master! Surely, you saw it. It was trying to kill the intelligent bird-creature, the last of its kind on the planet."

But Tark pointed with horror at the two unfeathered beasts, one bent over the body of the other. "But they were mates! You have killed their species! The female is grieving for its mate, Vascar. You have done a terrible thing!"

But Vascar shook her head crossly. "I'm sorry I did it then," she said acidly. "I suppose it was perfectly in keeping with our aim on this expedition to let the dumb beast kill

its master! That isn't like you at all, Tark! Come, let us see if the intelligent creature will not make friends with us."

And she flapped away toward the cawing crow. When Blacky saw Vascar coming toward him, he wheeled and darted away.

Tark took one last look at the female bending over the male. He saw her raise her head, and saw the tears in her eyes, and heard the sobs that shook her. Then, in a rising, inchoate series of bewildering emotions, he turned his eyes away, and hurriedly flapped after Vascar. And all that day they pursued Blacky. They circled him, they cornered him; and Vascar tried to speak to him in friendly tones, all to no avail. It only cawed, and darted away, and spoke volumes of disappointingly incomprehensible words.

When dark came, Vascar alighted in a tree beside the strangely quiet Tark.

"I suppose it's no use," she said sadly. "Either it is terribly afraid of us, or it is not as intelligent as we supposed it was, or else it has become mentally deranged in these last years of loneliness. I guess we might as well leave now, Tark; let

the poor creature have its planet to itself. Shall we stop by and see if we can help the female beast whose mate we shot?"

Tark slowly looked at her, his red eyes luminous in the gathering dusk. "No," he said briefly. "Let us go, Vascar."

THE SPACESHIP of the creatures from Alcon left the dead planet Earth. It darted out into space. Tark sat at the controls. The ship went faster and faster. And still faster. Flew at ever-increasing speed beyond the Solar System and into the wastes of interstellar space. And still farther, until the star that gave heat to Earth was not even visible.

Yet even this terrible velocity was not enough for Tark. Vascar looked at him strangely.

"We're not in that much of a hurry to get home, are we, Tark?"

"No," Tark said in a low, terrible voice; but still he urged the ship to greater and greater speed, though he knew it was useless. He could run away from the thing that had happened on the planet Earth; but he could never, never outrun his mind, though he passionately wished he could.

THE END.



THE KILKENNY CATS

By Kurt von Rachen

A sequel to "The Idealist," von Rachen shows a mouse may stop the self-murderous fight of a collection of Kilkenny Cats!

Illustrated by Schneeman

LARS TAVISH, Special Representative of the Enlightened People's Government, bearing sealed orders from Fagar, self-styled Dictator of All, licked his gross, cold lips in sardistic glee.

Sereon came spinning up out of the black and lonely void like a baseball. The giant dumbbell star, Sirius, even at this distance, was impossible to look upon and the glare shields had been drawn upon the bridge of the old royal battleship *Fury*.

The craft had been decelerating now for days, but its officers cared little for accuracy. In the old Royal Space Fleet there would have been snap and dash to this performance, but those now in command, no matter the enthusiasm with which they had helped foster the recent revolt, seemed to realize that they had killed the very soul of all for which tradition stood. And so the *Fury* was forced to blast extravagantly with her nose tubes and thus claw to a halt. And because the tubes were worn and the fuel of bad mixture, to say nothing of its original quality, the old *Fury* was refusing to halt. And up came Sereon much, much too fast. Not that anyone was very interested.

Lars Tavish essayed a jest to the bridge officer. "Are you sure that is Sereon and not Arceton, or Beophan, or Lyrac?"

The bridge officer, elevated to that rank from tubeman, third class, less than six months previous, was not at all sure. The navigating artists had only said that it was and they, in their absence of enthusiasm, would not have cared greatly. The bridge officer's sallow little face turned slightly pale and his hand upon his photobinoculars trembled, matters which did not go unnoticed by Lars Tavish—for all such signs fed his ego, starved so many years in the ninth stratum's dim laboriousness.

"Yes, companion," said the bridge officer, "it must be Sereon."

"But you don't know?" gloated Lars Tavish.

"Well . . . the navigators—"

"Hang the navigators! Have you yourself no conception of space? Haven't you even pored over the charts of this region so as to know what difficulties in spaceman ship you might encounter?"

The bridge officer was suddenly no longer frightened. In fact, in reaction, he was almost on the verge of laughing when he realized that laughing at Lars Tavish as an SREPG would result in his immediate demotion. At that time there were no charts on the Sirius System beyond the spotting of Sirius itself in the stereopographs. One expedition, in the royal rule, had stated that there were some ninety planets and that one, observed from afar,



"You've given them all the food and weapons," Blacker howled. Fagar's representative smiled. "But you've got more men—and the water. Good-by."

seemed to be in somewhat the same condition as Earth as to age and size.

Lars, thinking he had scored heavily, turned to watch Sereon. The mists about it were light and the silver indicated larger seas than con-

tinents. There seemed to be a normal zoning of climate if the brilliance about the poles could be taken for ice.

The time had come to open the sealed orders and, knowing Fagar,

and knowing, too, the strange passengers the *Fury* carried, Lars Tavish greedily anticipated the worst.

His thick hands drew the packet from the lining of his jacket and his dirty nails broke the seals. He retired to a wing and spread the sheet upon a fire-control board.

LARS TAVISH, SREPG
SPACE BATTLESHIP *FURY*
CONFIDENTIAL

Having followed instructions, you will have Sereon in sight when you read these orders.

You have in your care the landing of the Sereon Colonization Expedition and close attention must be given to the details.

JEAN MAUCHARD, despite the aid given us in our recent successful overthrow of the forces of the crown, is entirely too learned to be safe. His recent invention of weapons for our use demonstrated his potential threat to our command, especially since he has remonstrated against our outline of government. With his Sons of Science, sixteen in number, he must be disposed of in such a way as to allay any suspicion among the people that this government has anything to fear, especially since no specific crime can be pinned upon him. He and his followers, then, are to be landed on Sereon with the following considerations.

DAVE BLACKER, until recently the head of northwestern North America's long-shoreman organization, is also not to be trusted. He is dissatisfied with our government because he was not given sufficient place in it. Because he commands so much power, because of his considerable aid in our recent battles, he must also be disposed of in a quiet but thorough manner along with his chief organizers and shock troops to the number of three hundred and seventy-five.

COLONEL STEPHEN GAILBRAITH, the young fool who assumed the rule of California and favored aristocrats there, is too much idolized to be given the crudities of a firing squad. His inclusion in this expedition was necessary.

FREDERICKA STALTON, "the flame of liberty" girl, who sought to work against us when she found that our ideals were contrary to our speech and who, because of her brilliance as a propagandist, is also a member of your party.

Briefly, we know the hatred which is felt between Jean Mauchard and Dave Blacker and their organizations, occasioned by the suspicion of the unintelligent that a scientist is necessarily an aristocrat. Both Gailbraith and Stalton would be victimized by either faction.

The public believes that the Sereon Colonization Expedition is a "glorious effort to expand the power of Earth" and all its members have been appropriately heroized in the press, thus making us clean-handed in the affair.

It is not generally known that another expedition to Sereon, in the time of the "Mercury Age" some five hundred years ago, left an extensive colony there, for all such ancient charts and records were destroyed in the Eighth Martian Invasion of Earth. An attempt was made to visit this implanted colony seven years later, but no trace whatever could be found of its members. As there is only a bare mention of this in the existing records, our attempt will appear laudable.

ATTENTION TO ORDERS: You will land in a semidesolate region if one can be found. The scientists are to be given all scientific equipment and the food. The other faction, Blacker's, will receive no food but a scattering of secondary weapons. Try to arrange it so that the scientists will occupy a strategic position. Their "scientific equipment" will be found, on examination, to be old and, in the most part, worthless, with the exception of ray-insulators. Land Colonel Gailbraith and Fredericka Stalton with either faction or with neither. You will then withdraw from Sereon immediately. If these instructions are properly carried out we should not, in the future, be bothered with any single member of it.

SIGNED AND SEALED BY
MY HAND
FAGAR
DICTATOR OF ALL

Lars read it through twice, knowing he had about five minutes from the moment he had broken the seals. Then, having completed the second reading, he stood back. There was a puff of smoke and the instructions shriveled into a charred mass which, in turn, vanished. Lars grinned and turned to issue the necessary orders to the *Fury's* captain, who stood now at his post for the landing.

VICKY STALTON, a battered soldier's kepi upon her blond head, pulled down over one eye, and the faded and frayed remains of her Liberty uniform doing very little to keep out the chilling wind, looked disdainfully across the endlessly stretching plains. Behind her on a knoll was the *Fury*, a great black mass against a dun sky. About the packing case upon which she had perched herself the *Fury's* crew and the longshoremen—these under guard—toiled to stack up the boxes of food and crates of scientific equipment. A photographer from the Propaganda Department was taking a few shots from selected angles and using his selecto-shutter for all it was worth; he had to get cheerful expressions from the longshoremen and cut out the blacksticks in the hands of the guards.

"One from you, please, Miss Stalton," he said, holding up his hand to which the camera was affixed. "Smile?"

She looked at him coldly. "You'll paint in the smile, anyway. Why strain my face?"

"Thank you, Miss Stalton— Oh, yes. Colonel Gailbraith! Could I have one of you with Miss Stalton?"

"Take it," said Gailbraith, "and composite it."

"Thank you, Colonel Gailbraith. Have you any statement to make about this expedition? Your hopes of its success—"

"I've the same hopes for your lying soul, old fellow," said Steve.

"Thank you, Colonel Gailbraith," said the EPG man, skipping away to get some more statements and shots.

"To think," said Vicky, half aloud, "that I once worked for those heels."

Gailbraith leaned against her packing case and thoughtfully regarded the scene. He looked a little amused, especially when his eyes fell upon Mauchard.

Jean Mauchard was running here and there in a truly scientific dither, his ascetic face horrified by the way the cases of delicate instruments were being mishandled. And Blacker's bully boys, finding that it annoyed Mauchard and amused Dave Blacker, were dropping things and smashing things with a will.

"Companion Tavish!" wailed Mauchard. "They are ruining everything! How do you expect us to use these things if they are broken?"

Tavish, standing beside the cargo door, grinned an evil grin. "Oh, I don't think it will hurt anything. These cases are well packed."

Steve's amusement broke into a short, bitter laugh, so explosive that it brought both Blacker's and Mauchard's eyes upon him. Both scowled and thought something dark and then whirled back into their bickering.

"That," said Vicky Stalton, "is the way to get yourself loved."

"And why should I care about anyone loving me?"

She looked at him and, for an instant, some of the contempt and disdain faded from her handsome little face.

"They amuse me," said Steve Gailbraith.

"You'd laugh at a corpse," said Vicky.

"If the corpse happened to be Fagar's."

"What's that?" roared a guard who had been in hearing.

"I was merely maligning your supreme commander," said Steve indolently.

"You're liable to get in trouble," said the guard. "But as you are willing to take it back, I won't report it."

"Thank you," said Steve, "but as we probably won't live very long, I don't think I care to take it back."

Please write into your report that I consider Fagar a stupid upstart, a liar and a coward."

"You'll show some respect," said the guard, "or I'll show you what this blastick can do!"

"Well?"

THE GUARD approached threateningly. Suddenly there was a flurry of motion and the lightly snow-covered ground was churned by swift-moving feet. The guard picked himself up out of the slush, a careful hand to a numb jaw, and gazed with stupidity at his blastick which, by some mystery, reposed in the hands of Steve Gailbraith.

"Give me that!" shouted the sentry. "Captain! Companion Tavish! You devil! Give me that blastick!"

The guard rushed and there was a ripping sound. When he next picked himself out of the slush the guard was minus his blastick bandoleer.

"Now run along and play," said Steve, "or I'll burn holes in your underwear."

Several had assembled now, standing in a semicircle about Steve. They could not very well get behind him, for he had his back to a stack of cases and Vicky Stalton, on top of those cases, was thoughtfully rocking a heavy one back and forth to show how easily she could drop it on somebody's head.

"Take that gun away from him!" roared Tavish.

"Come and get it, companion," said Steve.

The sailors and marines fidgeted, but not one brought his weapon into firing position. There was something very strange about this Gailbraith, anyway. There was a tale about that he had, single-handed, taken over the government of California, and then, too, standing there with the cold wind in his hair and a colder

smile upon his young face, he seemed about ready to take over divers sailors and marines with the same expedition as he had applied to California.

"Take that gun away from him!" howled Tavish.

Steve indolently executed, with the amazing precision of the trained soldier, a twirl or two from the Martian manual of arms, than which there is none more complicated. The blastick soared in a little circle, came to shoulder hup, order hup, left shoulder hup, parade hup— Tavish, fuming, went away lest he have to obey the order himself.

"Say, that's pretty good," said a marine with professional interest. "I never could do it like them Martians."

"Oh, it's easy," said Steve, leaning on the gun. "Want to see how you do it with two at once?"

"Yeah," said the marine.

Steve extended his hand and the marine gave up the second blastick. Steve promptly sent both flashing through great arcs, one in each hand, punctuating the movements with single slaps. It was a remarkable exhibition, one which could have been found only in the old royal forces.

"Say, that's swell!" said the marine, holding out his hand for the weapon.

"One more trick," said Steve. And he tossed one gun over his head. There was a slap up there and all stared blankly at Vicky Stalton, who now held it, muzzle pointing down at them.

"Now go along and square away for the take-off," said Steve. "And thanks a lot for the guns."

"Don't mention it," snarled the marine. But he, too, finally drifted away.

STEVE SAT on a packing case with the gun across his knees, swinging his battered boots and aware of Vicky overhead without looking up at her.

Mauchard had worked himself into a frightful frenzy over his cases and the whole crew of longshoremen were nearly convulsed at the way they could make him angry.

"Very, very funny," mused Steve. "Abandoned on an unknown planet with only a few instruments and machines, without too much food and no shelter, and so it's a very, very fine joke to break up what little we do have."

"Men," said Vicky, "are fools."

"All men?" said Steve.

"All men," said Vicky with a womanly conviction.

"Me, too?"

"You, too! You might have gotten yourself killed just for the sake of two guns."

"We've got the guns, haven't we?"

"Yes."

"And without them we'd have short shrift from our friends, the illiterate and the superliterate, wouldn't we?"

"Well—"

"And yet I'll admit that it would seem that any effort at all is foolish, since this whole thing is sabotaged from the start. But I wasn't risking my life. They wouldn't risk killing any one of us. It might leak out back on Earth via the crew."

"And men are always right," said Vicky.

He looked up at her then and grinned. She didn't grin back.

Steve sighed. She was a strange child. How she hated to be beaten! And she seemed frightened of him, too. Every time things warmed up between them he would do something to cool them off again. She had, he knew, a defiant outlook and

a particularly bitter regard for him and all that he had represented. He was a gentleman of the military caste and she—well, somehow she had pulled herself up out of the tenelements, had fought out an education and had finally risen to nearly complete control of the revolutionary propaganda machine. It had been her face on the posters, crying them on to victory. "The Torch of Liberty Girl," they had called her. And now she was paying the penalty for her climb. She was neither a lady nor a tramp and, being neither, she could claim no protection from either of these violently disagreeing camps. And she was tasting bitterness so great that the injustice of it would probably have driven any other girl out of her mind.

"The camp," Tavish was bawling, "of the Sons of Science will be here on this knoll. Down by the river there, where we have placed the tents, we will encamp the longshoremen and their families. Lieutenant, issue out to the longshoremen fifty blasters and a thousand rounds of ammunition per gun."

Mauchard's face lighted up with relief and pleasure. He drew about him the small knot of scientists and began talking with them in low tones. They were all overjoyed at the separation.

Dave Blacker, too, was pleased. He helped hand out the weapons and then the ammunition, letting them pass through his hands to his men as though he himself was making the presentation. He was an incongruous figure upon this rough plain, for he wore a round hat and smoked a short cheroot and his checkered topcoat flapped against his legs. But there was nothing humorous about him, not the great Dave Blacker.

"Let's go, men!" cried Blacker and

led them off to the camp down by the river.

MEANTIME, the *Fury* began to pull in her ladders and batten her ports, pulling all her complement into her until only Lars Tavish stood without, making sure everything had been done.

Suddenly Mauchard recalled the issuance of the guns and found that none had been left to himself and his sixteen. "Tavish! There's been an error! We have no weapons!"

Tavish started to lift himself up into the ship. But just then Dave Blacker came tearing up the slope with hell in his eyes. "Tavish! You blackguard, there's been a mistake! There's not one can of food in my whole camp!"

Tavish grinned and vanished into the ship. The hatch slammed behind him and the *Fury* began to drift upward, rolling logily. Blacker made an ineffectual snatch at a single trailing line and missed.

The *Fury* rose to a thousand feet with her antigravitic gyros and then there came the sound of a giant clearing his throat. A few tentative spurts of flame burst back from her tubes, *brrrrupppp! brrrrupppppp! brupppppppppp!* and then a deafening roar of power streamed continuously over the plains. The *Fury* dwindled in size to a gnat against the dun sky and then the *Fury* was gone.

Blacker, raging, whirled to face Mauchard. Three longshoremen had struggled up, holding guns.

"Mauchard, you white-bellied tripe! I'm calling on you here and now to give up seven eighths of that food. Yes, I'm being white about it. I'm leaving you yours in the right proportion."

Mauchard's thin face was wreathed in a smile. "I am very sorry, my dear Blacker, but I am

afraid that we can't agree upon that."

"You mean, you overeducated imbecile, that you'll let us starve?"

Mauchard shrugged. "Of course, if you want to give up your weapons—"

"To hell with that! You'll give us food or you're a dead man!"

"Then I am a dead man," smiled Mauchard.

"No," said a thoughtful voice from the pile of crates, "there aren't going to be any corpses around here just yet."

The longshoremen looked up and realized that Gailbraith had cover and they had not and that their chances of hitting him before he killed them were very remote indeed.

"Now run along," said Steve.

"Yeah! Yeah, sure, I'll run along!" raged Blacker. "But there's one angle to this you ain't got through your heads. I got the water. I got the water and the guns. If you want water, you'll pay for it in food!" And he stomped away, slush flying out from beneath his feet.

Mauchard watched them go and then muttered: "Precious fool. As though we can't distill all the water we want from this mud!" He turned to Gailbraith. "Well? Why did you thrust yourself into that? You're not so welcome here that you can help us fight our battles."

"Not so welcome," said Steve, "but hungry. I didn't do that for love, Mauchard."

"Well?"

"Miss Stalton and I," said Steve, "happen to be hungry. Have a chemist stir us up a batch of vitamins and we'll call the account square."

"God, but you're sure of yourself!" said Mauchard with contempt.

"That," said Steve, "is the way to win battles."

"You can't stay here," said Mauchard, "unless you want to force yourself upon us with your two guns."

"Wouldn't dream of it," said Steve. "One meal, and the debt is paid."

"I suppose we owe you that," replied Mauchard, turning to give the order.

Vicky sat on the packing case and stared out across the dismal, cold plain. Blacker, a mile away, was putting up tents and these were all but lost with distance and the slush. Vicky looked at Steve.

"And after we eat?" she said. "We can't go down there, you know."

"After we eat, we think. A man thinks better on a full stomach."

"I have heard quite the reverse."

"Maybe the reverse is true," said Steve, "but mine sounds better."

WHEN THEY had eaten, Vicky Stalton and Steve sat before a fire built of fibroid packing cases and warmed themselves in silence. The scientists' camp was beginning to take shape, the heavier cases being laid end to end in a circle to form some sort of barricade. A youth with a very serious face was walking in an Archimedes spiral, gradually closing in upon the fire. He was carrying what appeared to be a hit-and-miss collection of junk with the same air of a man watering something with a sprinkling can. There was something to it, for the ground he left behind him not only became dry and smooth but as hard as marble. Two others, one of them old, creak-jointed, but protesting that he was quite as spry as he ever was, were going around the outside of the packing cases, bearing a tank and a hose. The latter had so much force that the pair seemed in danger of taking off like a rocketship. But the result

was good, for a trench was being dug and the residue therefrom was being slammed against the tall cases in such a way as to build a substantial parapet. Shortly, another pair of scientists lugged two huge bottles up to the top of the cases and, mixing the contents, emptied them into the ditch. The smell was pungent and made one feel dry. Water was collecting in the wide ditch with a rapidity which soon had it overflowing.

"Move, will you?" said a stern-faced fellow to Steve, kicking out the fire.

Steve and Vicky moved and let them spread out some very thin stuff. Although the packet seemed no bigger than a fist, there was enough in it to completely blanket the camp. Everyone got out for a little while and Mauchard oversaw the manipulation of a small tank. The thin material was blown up until it was like a dome over everything. Then it hardened and would not yield to the touch. A doctor took a torch and began cutting doors in the dome. Through these entrances marched half a dozen scientists, carrying hods of dirt which they dumped upon the flooring. Another torch began to sputter and the material, subjected to chemicals and heat, fluffed up into down which was then congealed into mattresses and cushions.

"Too damned scientific for me," said Steve with the practical viewpoint of the soldier.

Instantly a voice bit into him. "It may be too scientific for you to understand, you mean."

Steve looked wearily at Mauchard.

"You professional soldiers!" said Mauchard. "All you know how to do is destroy anything a scientist can build!"

"That knowledge," said Steve, "is sometimes handy." He would not

let himself be pulled into the ancient argument. "By the way, though I see a moat and a parapet, I don't see any other means of defense."

"They'll never have courage enough to attack us," said Mauchard.

"No? Those men attacked the citadel at Washington, remember. And they carried it."

"Drunk, most of them."

"And the citadel wasn't just a glassite dome with a moat around it, either," said Steve. "If you'll take my advice, you'll figure out some kind of a repulsion wave and surround this place with it."

Mauchard looked at Steve for several seconds, hating to take a suggestion. Then, "It seems to me that you are getting very mild."

"Because I suggest something with a humanitarian angle?"

It might have gone further if the man in charge of inventory had not demanded Mauchard's attention. "Doctor, I've been through what we have and I don't think a tenth of it is workable in any way. We've been criminally supplied. The food itself is only fifty percent unspoiled. The dynatomics are none of them capable of producing a volt and the machine tools are merely lead weights in boxes. This 'equipment' is mainly so much junk!"

Mauchard rushed off to check on his supply officer's findings.

Steve pulled up his coat collar against the wind and looked down at the camp of Dave Blacker. When Mauchard passed by again, Steve stopped him.

"Maybe military men," said Steve, "only know how to destroy and maybe not. But if you know anything about men, you'll know that such fellows as the gang down there will get angriest about empty stomachs. If you are wise, you'll send

down a flag of truce and offer them half your supplies."

"And show the louts that we're afraid of them? Bah!"

"All right, but if your entire dynatomic equipment is out of order and you lack tools to repair it, it's unlikely you can stave off even a feeble attack. And they'll not stop at killing you fellows to a man."

"We'll stop them," said Mauchard. "We'll stop them with acid bombs if nothing else."

"They could easily break through your acid bombs," said Steve. "You might get a hundred of them and the rest would still get through."

"Then we'll get the hundred of them," said Mauchard. "And if I happen to want any advice, Colonel Gailbraith, I shall send for you. But I don't think I shall find myself in need of any."

"Then let them roast you with their blasticks and be damned to the lot of you," said Steve, turning on his heel.

VICKY WATCHED Steve walk away. She looked at Mauchard, but she found nothing even remotely approaching sympathy in his face. His distrust of her was so great that it did not seem able to encompass the fact that her blastick might be of use in case of attack. Vicky raked him with disgust and then, giving her little kepi a tug down over one eye, she slid her arm through the blastick's sling and trudged after Steve.

When she caught up with him she did not look up into his face, despite the impulse.

"So here we are again," said Steve.

"More's the fool for me," said Vicky. "You're heading for God knows where. There's no limit to these plains that I can see."

"And no limit to the stupidity of man," said Steve.

"Let them knock each other off and to hell with them," said Vicky.

"Which is to say, 'to hell with us,'" replied Steve. "There's one point they can't get through their thick skulls. Seventeen scientists stand about as much chance of getting along on Sereon without laborers as an aristocrat has in Chicago. And a hundred and seventy-five longshoremen and women stand no chance at all without scientists. And yet there they are, in two camps, each one helpless without the other and both of them on the verge of wiping the other out. By dawn there'll be perhaps a hundred longshoremen and no scientists whatever. I know the signs. I didn't live through half a hundred campaigns without learning to read men."

"There's nothing you or I can do about it," said Vicky. "A broken-down war horse and a guttersnipe—"

"May I object? At thirty-one a man is not exactly broken down. And I haven't seen any guttersnipes around here."

"Yeah? Well, like it or not, fellow, you are broken-down. And whether I like it or not, I'm too good for the horny-palmed and too bad for the upper crust. And if I have to trail along with you it's because I can't trail with anybody else."

"You're very funny at times," said Steve. "You talk as if you hate me."

"Maybe I do."

"But why?"

"Because, when you pulled that trick on the *Fury*, I was fooled into thinking you were something else than what you are."

"For a moment I saw you hauling down Fagar's empire with one hand. But here you are, bluffed out of a camp without having so much as lifted your little finger to prevent it."

"You're pretty hard on people, aren't you?"

"I have to be. You trust somebody and he lets you down. That's the story. I trusted this revolt and look what happened. And it was the first thing I ever trusted in my whole life."

"So, with womanly logic, you don't trust me."

"Why should I?"

"You are with me."

"Because I don't like talking to myself. We're two outcasts and we might as well face it. We're walking out here to death by starvation and cold. As soon as Sirius is rolled under that horizon we'll turn as stiff as corpses. The manufacturer that contracted this uniform must have made himself a lot of money, selling gauze for suiting. See? It will be dark in three or four hours."

"Look," said Steve, "why don't you stop trying to propagandize me into a lather of activity. I got guns for us and a full meal. Now let me take it easy for a time, will you?"

"You could have held a gun on Mauchard—"

"To what purpose? So that we'd be in full target form for that attack?"

She was silent for a long space, and Steve said to himself, "There I go being right again."

BUT BOTH of them, shortly after, forgot their bickering. Ahead of them something white came up to the rim of a gully and stood staring at them. They stopped. It did not run away, but, on the contrary, began to slowly advance toward them.

"What is it?" said Vicky as calmly as possible.

"No telling," said Steve.

Its fur was shaggy and its nose was long and its mouth was full of fangs. It might have weighed around a hundred and twenty pounds, for it was incredibly gaunt

for its great frame. Its four feet were armed with two-inch claws. It had its head thrust forward and its ears erect and seemed to possess

more curiosity than fear. And then it got the scent of them and its head came up and it began to lope forward with eagerness, its yellow eyes



The man realized bitterly that if these torches gave out a little too soon, every man in the colony would die. Though for different reasons—

agleam with hunger, its great jaws slavering.

Steve dropped to one knee in the slush and took careful aim. He let it get within thirty paces and then fired. Smoking, it went into a ball and rolled over and over itself, so great had been its speed, plowing a long furrow in the muck.

Cautiously Steve approached it. But his shot had been true, beaming through the skull and setting the scalp on fire. He rolled it over with his foot and its jerking legs made Vicky leap back in the belief that it was still alive. She was instantly ashamed of the action and stepped closer immediately.

"Smells . . . smells like . . . I don't know," she said. "I seem to remember the odor from somewhere."

"From your ancestors," said Steve. "Somebody brought a thing like this down from Siberia one year. He called it a wolf. It wasn't exactly like this, though. Not so big or so bad-looking." He relapsed into thoughtfulness and Vicky's questions went unanswered.

"Well," he said at last, "my luck is holding. When I saw a bunch of these things from the *Fury*, I wouldn't permit myself to hope."

"What's so wonderful about a 'wolf'?" said Vicky.

"Two things. One is that they are carnivorous and the other is that there are lots of them."

"Maybe it's me that's dumb."

"Well, you see, if there are carnivorous beasts about, why there certainly must be game. Not much game, judging from the starved condition of this fellow, but enough—Or wait, I'll amend that. There may be lots of game but too many wolves and the said game is too fast on its feet. I've always crabbed about scientists, but I'm beginning to wish a

couple hundred of them had spent a few lifetimes on the subject of Sereon's fauna and flora. Well! Let's look for the game."

They trudged along, but now on the alert. And after another hour of scouting they came upon a grassy depression in the plain wherein grazed the game. There was a herd of white animals, some of them with single, some with double horns and all of them with sharp hoofs if their tracks were an indication. They were very shaggy, especially about the shoulders and heads. They stood about five feet at the shoulders and must have weighed between fifteen hundred pounds and a ton, fully grown. The formation of the herd was unique, for it was circular and there were obvious sentinels upon high points which did not graze but stood steadily regarding various sections of the horizon.

"Maybe there's the dinner," said Steve, sliding down a rocky slope with all possible caution. He was careful to be downwind of his game, for he had learned this trick in fighting Tarcites, the warriors of Planton, who seemed to be able to smell better than they could see. But if Steve expected game or thought himself a match for these animals, he was in error.

While still five hundred yards away a stone rolled under his foot and the sentinel nearest him reared to get a better view. A moment later the sentinel backed into the herd and grazing ceased. Steve thought he had better take a long-range chance and set his telesight for temperature. But even while he was doing this the whole herd, not caring to ponder the matter further, began to move away at a steady trot.

Steve stared at their retreating backs in astonishment. He could

Continued on page 112

What is SPECIALIZED FICTION?



Eighty-five years ago the publishing house of Street & Smith was born. The men who founded this company blazed a trail for newsprint magazines—they pioneered—they did not enter a field, they created one.

They studied the reading public's needs and discovered that millions of readers were not having their reading tastes satisfied by the general magazines, for they never could tell when they would be given a particular type of story they especially liked to read. And for this great audience books were too expensive in the quantities they desired.

For these, Street & Smith created newsprint magazines each containing one type of story—so Specialized Fiction came into being.

While building these magazines Street & Smith editors chose genius unknown and helped it into print. Many of the great names of today saw their first published works appear in our magazines; for example:

George Barr McCutcheon
E. Phillips Oppenheim
Mary Roberts Rinehart
Albert Payson Terhune

Stewart Edward White
Theodore Dreiser
Rudyard Kipling
Booth Tarkington

Gouvenor Morris
A. Conan Doyle
O. Henry
Rupert Hughes

This process of helping authors climb the ladder of fame continued during the years down to the present hour—AND TODAY—

Steve Fisher, who just wrote "Typhoon" for Dorothy Lamour's current technicolor picture, has stories appearing regularly in CLUES, THE SHADOW, MYSTERY and ROMANTIC RANGE.

Erle Stanley Gardner—is known as the greatest American detective-fiction author—writes for DETECTIVE STORIES and CLUES.

Frank Gruber, winner of the Mary Roberts Rinehart mystery contest with "The French Key," this year's best seller in detective fiction, writes regularly for CLUES, MYSTERY and THE SHADOW.

Dick Moreland—"20 Mule Team," Wallace Beery's new movie, was made from one of his books. He writes regularly for LOVE STORY.

These four are but a few examples of how Street & Smith editors search today, as they did yesterday, for the best, by the best writers, to please all with their Specialized Fiction Magazines.



Are you thrilled by the hard-riding, swift decisions of life or death, flashing guns, the vigorous outdoor adventure of the Old West? Then you'll enjoy

**WESTERN STORY WILD WEST WEEKLY
WESTERN ADVENTURES**

Do you enjoy solving problems? Like the radio quizzes? Does a murder mystery intrigue you? Then you'll be thrilled while reading

DETECTIVE STORY MYSTERY CLUES-DETECTIVE



Perhaps the romance of burning love pleases you? Or love in the modern note—as up-to-the-minute as tomorrow's news? Or love that flashes like the flaming six-gun of the West? Then you'll be thrilled with

LOVE STORY MAGAZINE ROMANTIC RANGE

If you enjoy the icy feet of invisible lizards marching down your spine. If you enjoy busting open the silly dignity of this pompous old world, you'll more than enjoy

UNKNOWN



Possibly the crack of the bat—the thud of leather—the swiftness of silver skates—the ring of flying hoofs relaxes you most. Then you'll escape this everyday world with

SPORT STORY



What will our great grandchildren do—how will they act? When we think of the changes in the past hundred years, doesn't it envisage tomorrow's world as wonderful—terrible? The answer to thoughts like those you'll find in

ASTOUNDING SCIENCE-FICTION



The thrill-packed adventures of a modern specialist in crime prevention—the newest adventures in the world of finance—the adventures of a man-of-science who protects the unprotected. Do these please you? Then you'll enjoy

**THE SHADOW DOC SAVAGE THE AVENGER
THE WHISPERER THE WIZARD**



All these magazines are published by

STREET & SMITH

PUBLICATIONS, INC.

79 Seventh Avenue

New York City

Continued from page 109

not get in a shot now until he had worked around and found one standing, for it would be too much to expect to get results from a back shot.

"Something funny about this," said Steve.

WITH VICKY trailing him, Steve dodged from rock to rock around the rim of the valley, and when he was again within five hundred yards he took a careful selection of the herd, a young cow, and drilled her through the head. She went down to her knees. The group milled about her in anxiety, scanning the horizon for danger. The mill got wider and wider, hiding the shot animal completely. And then the whole herd darted off at a pace which would take it miles before it again stopped.

Other white shapes were darting about the rocks, but Steve was intent upon his game. He went down the slope on the run, overjoyed to see that his shot had been perfect and that the cow was now stretched out and dead. But before he got to it a scream from Vicky told him of a danger he did not instantly recognize.

The white shapes were wolves, closing in upon the dead cow at a speed which would bring them up to it almost at the same time as Steve would arrive.

"Steve!"

But Steve wasn't giving in. He heard the savage sizzle of Vicky's blastick and saw something tumble over and over on his left. And then he was at the carcass of the cow. He whirled in time to drill a wolf in midflight and to club another's jaw half off as it snapped at him. He clicked the blastick to "spray" and gave the whirling white mass a dose of roaring flame. The wolves, snarling and snapping, streaked away

* from the unknown menace. A few were headed toward Vicky, but these, the second she fired at them, leaped aside in bewilderment.

She came up with Steve. Her face was pale with fright, but she had a good grip on herself.

"There seem to be dozens of those things," she said shakily.

"There are a few less than that now," said Steve, indicating the eleven which had fallen about him. "I wish I had chosen an animal with a little less weight. This is going to be hard to do."

"What?"

"Getting it over to that grove of trees."

"Why?"

"To get firewood," said Steve impatiently. "They are afraid of fire. Now quit talking and grab a leg."

But it was almost impossible for them to move it and Steve halted again. He began to search through his pockets with numb fingers in an effort to locate his penknife, and when he got it out he was scarcely able to open the blade.

"It's getting cold," said Vicky, looking with frightened eyes into the twilight sky.

Steve worked at the messy task of getting a haunch off the animal. When he had succeeded he was blood to his elbows.

The wolves were coming back, closer and closer, jaws slavering at the smell of fresh blood, forgetting already the lesson of the blasticks.

Handing Vicky his rifle, Steve marched toward the grove of trees. Behind them the wolves closed in upon the remains of the carcass and, with snaps and howls, began to tear at it and the dead bodies of their late brothers. Vicky looked back and shuddered.

In the grove they broke off limbs from some down timber and, crack-

ing it into short sections, fired a blast cartridge into it. The result made them grin at each other.

"Now for a ring of them and a camp," said Vicky.

Steve said nothing. He hacked off two steaks and spitted them on green sticks and gave them to Vicky to broil. He ventured to the edge of the grove and found that the wolves had fairly cleaned up the dinner he had given them. There had not been enough to begin to go around and some of the hungriest were beginning to scout in earnest for the two eatable things which had gone away from there.

Coming back, Steve brought the material for torches, having found a type of bark which was easily stripped. He made a bundle of the lengths and then, to that, made another bundle until he had nearly thirty torches.

"Soup's on," said Vicky.

They ate in silence, both keeping an eye upon the growing ring of yellow eyes which increased gradually in the outer dark.

"This," said Vicky when they had finished, "is not going to be a very comfortable night."

"Not with the walking we have ahead," said Steve.

She stopped licking her fingers and stared at him. "Walking?"

"Walking. You carry that bundle of torches. I carry the beef. We keep our guns ready and one torch apiece lighted. We may get through."

"But where?"

"I imagine Dave Blacker's boys are getting pretty hungry by this time."

"Dave— Say, listen, Santa Claus, that haunch wouldn't last three hundred and seventy-five one bite apiece. And if you think you can

buy Blacker's love with some beef, you're crazy!"

"It's worth a try," said Steve. "Gather up those torches." He leaned over to the fire ring and lighted two. They flared and the wolves opposite that side leaped back a few steps and snarled.

"I refuse to do such a mad thing!"

"Then stay here and sing lullabies to these babies," said Steve. He got up and, shouldering the haunch, marched out through the fire ring at the wolves.

"Steve! Wait!"

She came swiftly up beside him, shivering. The wolves gave way swiftly before the flare of the torches and, skulking out, circled to come in from behind and trail hopefully, turned back each time by a thrust torch when they became too bold.

"How are you going to find the way back?" quavered Vicky.

"I got a homing pigeon in my head."

"You got a screw loose in your head if you ask me! Wait, that meat is dripping blood. What if it leaves a trail that other wolves will spot? If they get to be enough of them, they'll attack, torch or no torch."

"One of the chances one takes," said Steve.

She clung close to his side, not admitting the terror which gripped her, and not admitting, either, that she was grateful beyond words for the stalwart company of Steve Gailbraith.

THE PLAINS reached out in blackness, their immensity felt rather than seen. The uneven earth played tricks upon their feet, appearing solid when it was soft, soft when solid. The night was alive with the sudden flashes of yellow eyes, the abrupt

nightmare of a shadowy form attempting bravery enough to close in; long, leaping shadows sent out by the guttering torches played eerily upon the pack. Far-off wolves howled and then nearer at hand, betokening the increasing numbers which sought to allay the sharp, gnawing twist of empty stomachs.

One by one the torches in the pack diminished, even though each, before the hot was lit, was held until it was too hot to hold. Torch after torch, mile after mile. And ever-thickening patches of eyes just on the outskirts of the moving flames' light.

Vicky clung closer and closer to Gailbraith and, as it seemed to her with doubling certainty that they could never reach the camp, railed inwardly and sometimes outwardly at him, her fear giving edge to her words.

Overhead a strangely constellated sky gave no clue to direction, and it was a terrible thing to look up and see no familiar Dipper, or Swan, or Lion, but only weirdly shaped clusters which had no names, no traditions, no comfort.

On and on, mile upon mile, through the thick black of the illimitable plains.

"Oh, my God!" cried Vicky at last. "We'll never make it! We've got to find trees and build fires! There are thousands of these devils now!"

"Steady," said Steve. "I am following wind direction, and trusting that the wind has not changed, we'll be seeing the lights of the camp soon."

"You said that an hour ago. Oh, Steve, have mercy on me! I've walked through my boots and I'm as cold as a corpse. And what good will it do to take that miserable haunch to a fool like Blacker?"

"A little farther," said Steve.

A little farther. And then a little farther. And the bundle of torches had grown so light that she scarcely noticed their weight. And they had seen no trees.

"Last torch," said Vicky, extending it to him.

He started to light it and then had to divert his movement into stabbing at a particularly brave wolf. The furry face blazed and the eyes went blind, and there was a shriek of agony as the brute reeled back, a torch himself, scattering the ranks of his brethren in all directions.

"Get a grip on yourself," said Steve to Vicky. "Get hysterical when we're safe, but until then save your energy."

She hated the hard command in his voice and suddenly saw him as a thing of steel, unmoved by pain or sorrow or anything. And she was about to snarl at him for accusing her of weakness when he continued:

"There are the lights of the camp about half a mile ahead. And it looks as if there were something doing."

Vicky looked at the far-away pin points on the plain and then at the swiftly burning torch. They would have to fight the last of the way with their sticks.

"Speed it up," said Steve.

She had to trot to keep up with his long, fast strides. She could not stop watching the failing torch. The lights ahead seemed to get no brighter.

There was a dull vibration in the air now which could be heard above the quarreling of the wolves. Gunfire!

"Speed it up," ordered Steve, breaking into a run.

She was too angry and too weary to protest. Somewhere down in the last recess of her she found enough

energy to keep pace. Her lungs felt like pools of acid in her breast and her side hurt until it brought tears. But there were the wolves, closer now that there was but one torch, and ahead there was sanctuary of a sort—if that battle did not prevent them from getting through.

The last torch was scorching Steve's fingers, and he whirled about and flung it into the pack.

But they were almost to the bottom of the knoll of the scientists' camp and, by backing and firing, they managed their ascent.

THE NIGHT was crackling with the flame guns. There was a biting acidity in the air from acid bombs. And there were screams and curses and struggling shadows.

Steve saw the battle had not been long in progress. There were not enough dead men on the ground and the longshoremen were still burning ammunition without a thought to its conservation. They were safe now—but—

"Charge the place!" bawled a voice in the unevenly flaring night. "From this side! Rally here!" There was more, all of it blasphemous. Dave Blacker was ordering the main attack.

Steve strode to where Blacker stood behind his line of fighters. "Blacker!"

"You! Get out of here. I'm busy."

"Sure," said Steve. "Sure, you are. You've got Mauchard where you've wanted him for months."

"You're damned right," said Blacker. "Now beat it."

"Sorry to be insistent," said Steve, "but there's something a shade more important just now than wiping out Mauchard's crew."

"Yeah? Well, try and stop these

men of mine. They're starved! Get out before I have somebody!"

There came a shriek of amazed horror from down the slope and suddenly three men charged past Blacker and Steve, rushing blindly at the gleaming dome of the scientists' camp. There was a hiss and a snap and an acid bomb's curling, gleaming vapor marked the place where they had been. The one behind, being eaten even as he still moved, flung himself wildly into the moat. A curl of smoke, increased by the water, swallowed him forever.

There came another shriek from another quarter and this time there was something distinguishable in the cry. Something which sounded like, "Wolves!"

Blacker started to rush back down the slope to see what the trouble was, but Steve yanked him to a halt and faced him around. "I was trying to tell you. There are enough wolves out there to eat the last man in this expedition. Your women and children are unprotected in your camp. Call off this attack and send help down there and don't waste time!"

Blacker blinked disbelief. But the shrieks were renewed and then it was apparent that blasticks were being fired outward, not inward at the dome.

It did not take Blacker long to issue those orders or for the detached force to race away to the longshoreman camp to get there before the wolves.

The firing was wholly outward now and the rain of acid from the dome had stopped, Mauchard wondering what was happening.

"Mauchard!" bawled Steve.

After an interval an answer came back.

"Mauchard, this is Gailbraith. There are wolves all about you, and they're only afraid of fire, not acid.

If you value your own lives, don't depend on that flimsy glassite. Blacker has offered to bring gunners inside to help you stand them off."

"To hell with Blacker!" cried the invisible Mauchard.

"Order your men to draw in slowly upon that dome!" said Steve to Blacker.

"And get more bombs?"

"They won't heave bombs when they see the wolves."

Their own position was shortly untenable, for the men were already drawing in upon the dome, not certain what would happen if the wolves might charge, not knowing whether or not blasticks would hold them back. In the eyes of the fighters there was a terrified dread.

Steve shoved Blacker in toward the dome. Mauchard, by throwing up a few flares, had seen the wolves. And when Steve came opposite a small causeway over the moat, it was swung out for him.

Two hours later there was a strange conference in the dome. Gailbraith had been eating a steak, as had Mauchard and Blacker. There were still longshoremen posted at the loopholes and occasionally these sniped at a wolf, fighting with other wolves over the dead.

"I don't like to butt in, of course," said Steve, lighting one of Mauchard's cigarettes, "but it seems to me that you two gentlemen have each other stopped. Blacker has rifles. You have dry supplies. You have broken-down scientific equipment; Blacker has mechanics who can fix things, tools or no tools. Just as a suggestion, why not call a thirty-day truce until you get better organized."

"Huh," said Mauchard.

"Well, you saw just now that Blacker's men were necessary to your existence," said Steve. "And Blacker knows that he can't hold his men together unless he can get food. Tell you what I'll do, gentlemen. If you'll sign and keep a thirty-day truce, I'll guarantee to provide as much fresh meat as this whole expedition can eat and keep on supplying it."

"Well—" said Blacker, doubtfully.

"Just thirty days. And then you can break up or stick together as you please," said Steve.

"I guess," said Mauchard, "that I could stand it for thirty days."

"But not longer," said Blacker.

"Will you shake on that?" said Steve.

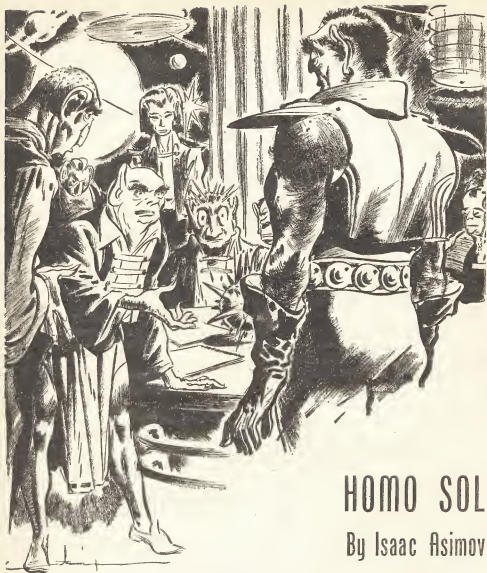
Diffidently, the pair shook.

Steve got up and wandered over to the embrasures. He whispered to a gunman there that it might be a good idea to get some food from Blacker to take down to the camp.

And then Steve found a blanket and spread it on a couch and comfortably disposed himself for slumber.

Vicky saw him lie down. From her own pallet, lifting herself on one arm and cupping her weary little face in her palm, she looked wonderingly at him.

"An Air Force officer, a rebel, a governor, and now a general commanding a commandeered force of wolves." And after a little while she asked herself, "But did he go out just to collect the brutes?" She lay down again and stared through the dome at the strange stars which winked and blinked. "Did he?" she whispered to herself. "Or didn't he?"



HOMO SOL

By Isaac Asimov

The Galaxy had a nice, stable civilization—till Earthmen, the prize gadget maniacs of space, came along!

Illustrated by M. Isip

THE seven thousand and fifty-fourth session of the Galactic Congress sat in solemn conclave in the vast semicircular hall on Eron, second planet of Arcturus.

Slowly, the president delegate rose

to his feet. His broad Arcturian countenance flushed slightly with excitement, as he surveyed the surrounding delegates. His sense of the dramatic caused him to pause a moment or so before making the official

announcement—for, after all, the entrance of a new planetary system into the great Galactic family is not a thing likely to happen twice in any one man's lifetime.

A dead silence prevailed during that pause. The two hundred and eighty-eight delegates—one from each of the two hundred and eighty-eight oxygen-atmosphere, water-chemistry worlds of the System—waited patiently for him to speak.

Beings of every manlike type and shape were there. Some were tall and polelike, some broad and burly, some short and stumpy. There were those with long, wiry hair, those with scanty gray fuzz covering head and face, others with thick, blond curls piled high, and still others entirely bald. Some possessed long, hair-covered trumpets of ears, others had tympanum membranes flush with their temples. There were those present with large gazellelike eyes of a deep-purple luminosity, others with tiny optics of a beady black. There was a delegate with green skin, one with an eight-inch proboscis and one with a vestigial tail. Internally, variation was almost infinite.

But all were alike in two things.

They were all Humanoid. They all possessed intelligence.

The president delegate's voice boomed out then: "Delegates! The system of Sol has discovered the secret of interstellar travel and by that act becomes eligible for entrance into the Galactic Federation."

A storm of approving shouts arose from those present and the Arcturian raised a hand for silence.

"I have here," he continued, "the official report from Alpha Centauri, on whose fifth planet the Humanoids of Sol have landed. The report is entirely satisfactory and so the ban upon travel into and communication

with the Solarian System is lifted. Sol is free, and open to the ships of the Federation. Even now, there is in preparation an expedition to Sol, under the leadership of Joselin Arn of Alpha Centauri, to tender that System the formal invitation into the Federation."

He paused, and from two hundred and eighty-eight throats came the stentorian shout: "Hail, Homo Sol! Hail, Homo Sol! *Hail!*"

It was the traditional welcome of the Federation for all new worlds.

TAN PORUS raised himself to his full height of five feet two—he was tall for a Rigellian—and his sharp, green eyes snapped with annoyance.

"There it is, Lo-fan. For six months that damned freak squid from Beta Draconis IV has stumped me."

Lo-fan stroked his forehead gently with one long finger, and one hairy ear twitched several times. He had traveled eighty-five light years to be here on Arcturus II with the greatest psychologist of the Federation—and, more specifically, to see this strange mollusk whose reactions had stumped the great Rigellian.

He was seeing it now: a puffy, dull-purple mass of soft flesh that writhed its tentacular form in placid unconcern through the huge tank of water that held it. With unruffled serenity, it fed on the green fronds of an underwater fern.

"Seems ordinary enough," said Lo-fan.

"Ha!" snorted Tan Porus. "Watch this."

He drew the curtain and plunged the room into darkness. Only a dim blue light shone upon the tank, and in the murk the Draconian squid could barely be discerned.

"Here goes the stimulus," grunted

Porus. The screen above his head burst into soft green light, focused directly upon the tank. It persisted a moment and gave way to a dull red and then almost at once to a brilliant yellow. For half a minute it shot raggedly through the spectrum and then, with a final glare of glowing white, a clear bell-like tone sounded.

And as the echoes of the note died away, a shudder passed over the squid's body. It relaxed and sank slowly to the bottom of the tank.

Porus pulled aside the curtain. "It's *sound* asleep," he growled. "Hasn't failed yet. Every specimen we've ever had drops as if shot the moment that note sounds."

"Asleep, eh? That's strange. Have you got the figures on the stimulus?"

"Certainly! Right here. The exact wave lengths of the lights required are listed, plus the length of duration of each light unit, plus the exact pitch of the sounded note at the end."

The other surveyed the figures dubiously. His forehead wrinkled and his ears rose in surprise. From an inner pocket, he drew forth a slide rule.

"What type nervous system has the animal?"

"Two-B. Plain, simple, ordinary Two-B. I've had the anatomists, physiologists, and ecologists check that until they were blue in the face. Two-B is all they get. Damn fools!"

Lo-fan said nothing, but pushed the center bar of the rule back and forth carefully. He stopped and peered closely, shrugged his shoulders, and reached for one of the huge volumes on the shelf above his head. He leafed through the pages and picked out numbers from among the close print. Again the slide rule.

Finally he stopped. "It doesn't make sense," he said helplessly.

"I know that! I've tried six times in six different ways to explain that reaction—and I failed each time. Even if I rig up a system that will explain its going to sleep, I can't get it to explain the specificity of the stimulus."

"It's highly specific?" questioned Lo-fan, his voice reaching the higher registers.

"That's the worst part of it," shouted Tan Porus. He leaned forward and tapped the other on the knee. "If you shift the wave length of any of the light units by fifty angstroms either way—any *one* of them—it doesn't sleep. Shift the length of duration of a light unit two seconds either way—it doesn't sleep. Shift the pitch of the tone at the end an eighth of an octave either way—it doesn't sleep. *But* get the right combination, and it goes straight into a coma."

Lo-fan's ears were two hairy trumpets, stiffly erect. "Galaxy!" he whispered. "How did you ever stumble on the combination?"

"I didn't. It happened at Beta Draconis. Some hick college was putting its freshmen through a lab period on light-sound reactions of molluscoids—been doing it for years. Some student runs through his light-sound combinations and his blasted specimen goes to sleep. Naturally, he's scared out of his wits and brings it to the instructor. The instructor tries it again on another squid—it goes to sleep. They shift the combination—nothing happens. They go back to the original—it goes to sleep. After they fooled around with it long enough to know they couldn't make head or tail of it, they sent it to Arcturus and wished it on me. It's six months since I had a real night's sleep."

A MUSICAL note sounded and Porus turned impatiently.

"What is it?"

"Messenger from the president delegate of Congress, sir," came in metallic tones from the telecaster on his desk.

"Send him up."

The messenger stayed only long enough to hand Porus an impressively sealed envelope and to say in hearty tone: "Great news, sir. The system of Sol has qualified for entrance."

"So what?" snorted Porus beneath his breath as the other left. "We all knew it was coming."

He ripped off the outer sheath of cello-fiber from the envelope and removed the sheaf of papers from within. He glanced through them and grimaced.

"Oh, *Rigel!*"

"What's wrong?" asked Lo-fan.

"Those politicians keep bothering me with the most inconsequential things. You'd think there wasn't another psychologist on Eron. Look! We've been expecting the Solarian System to solve the principle of the hyperatomo any century now. They've finally done it and an expedition of theirs landed on Alpha Centauri. At once, there's a politicians' holiday! We must send an expedition of our own to ask them to join the Federation. And, of course, we must have a psychologist along to ask them in a nice way so as to be sure of getting the right reaction, because, to be sure, there isn't a man in the army that ever gets proper training in psychology."

Lo-fan nodded seriously. "I know, I know. We have the same trouble out our way. They don't need psychology until they get into trouble and then they come running."

"Well, it's a cinch I'm not going to Sol. This sleeping squid is too important to neglect. It's a routine job, anyway—this business of raking in new worlds; a Type A reaction that any sophomore can handle."

"Whom will you send?"

"I don't know. I've got several good juniors under me that can do this sort of thing with their eyes closed. I'll send one of them. And meanwhile, I'll be seeing you at the faculty meeting tomorrow, won't I?"

"You will—and hearing me, too. I'm making a speech on the finger-touch stimulus."

"Good! I've done work on it, so I'll be interested in hearing what you have to say. Till tomorrow, then."

LEFT ALONE, Porus turned once more to the official report on the Solarian System which the messenger had handed him. He leafed through it leisurely, without particular interest, and finally put it down with a sigh.

"Lor Haridin could do it," he muttered to himself. "He's a good kid—deserves a break."

He lifted his tiny bulk out of the chair and, with the report under his arm, left his office and trotted down the long corridor outside. As he stopped before a door at the far end, the automatic flash blazed up and a voice within called out to him to enter.

The Rigellian opened the door and poked his head inside. "Busy, Haridin?"

Lor Haridin looked up and sprang to his feet at once. "Great space, boss, no! I haven't had anything to do since I finished work on anger reactions. You've got something for me, maybe?"

"I have—if you think you're up to it. You've heard of the Solarian System, haven't you?"

"Sure! The visors are full of it. They've got interstellar travel, haven't they?"

"That's right. An expedition is leaving Alpha Centauri for Sol in a month. They'll need a psychologist to do the fine work, and I was thinking of sending you."

The young scientist reddened with delight to the very top of his hairless dome. "Do you mean it, boss?"

"Why not? That is—if you think you can do it."

"Of course I can." Haridin drew himself up in offended hauteur. "Type A reaction! I can't miss."

"You'll have to learn their language, you know, and administer the stimulus in the Solarian tongue. It's not always an easy job."

Haridin shrugged. "I still can't miss. In a case like this, translation need only be seventy-five percent effective to get ninety-nine and six tenths percent of the desired result. That was one of the problems I had to solve on my qualifying exam. So you can't trip me up that way."

Porus laughed. "All right, Haridin, I know you can do it. Clean up everything here at the university and sign up for indefinite leave. And if you can, Haridin, write some sort of paper on these Solarians. If it's any good, you might get senior status on the basis of it."

The junior psychologist frowned. "But, boss, that's old stuff. Humanoid reactions are as well known as . . . as— You can't write anything on them."

"There's always something if you look hard enough, Haridin. Nothing is well known; remember that. If you'll look at Sheet 25 of the report, for instance, you'll find an item concerning the care with which the

Solarians armed themselves on leaving their ship."

The other turned to the proper page. "That's reasonable," said he. "An entirely normal reaction."

"Certainly. But they insisted on retaining their weapons throughout their stay, even when they were greeted and welcomed by fellow Humanoids. *That's* quite a perceptible deviation from the normal. Investigate it—it might be worth while."

"As you say, boss. Thanks a lot for the chance you're giving me. And say—how's the squid coming along?"

Porus wrinkled his nose. "My sixth try folded up and died yesterday. It's disgusting." And with that, he was gone.

TAN PORUS of Rigel trembled with rage as he folded the handful of papers he held in two and tore them across. He plugged in the telecaster with a jerk.

"Get me Santins of the math department immediately," he snapped.

His green eyes shot fire at the placid figure that appeared on the visor almost at once. He shook his fist at the image.

"What on Eron's the idea of that analysis you sent me just now, you Betelguesian slime worm?"

The image's eyebrows shot up in mild surprise. "Don't blame me, Porus. They were your equations, not mine. Where did you get them?"

"Never mind where I got them. That's the business of the psychology department."

"All right! And solving them is the business of the mathematics department. That's the seventh set of the damndest sort of screwy equations I've ever seen. It was the worst yet. You made at least seventeen assumptions which you had no right to make. It took us two weeks to

straighten you out, and finally we boiled it down—"

Porus jumped as if stung. "I know what you boiled it down to. I just tore up the sheets. You take eighteen independent variables in twenty equations, representing two months of work, and solve them out at the bottom of the last, last page with that gem of oracular wisdom—'a' equals 'a.' All that work—and all I get is an identity."

"It's still not my fault, Porus. You argued in circles, and in mathematics that means an identity and there's nothing you can do about it." His lips twitched in a slow smile. "What are you kicking about, anyway? 'A' does equal 'a,' doesn't it?"

"Shut up!" The telecaster went dead, and the psychologist closed his lips tightly and boiled inwardly. The light signal above the telecaster flashed to life again.

"What do you want now?"

It was the calm, impersonal voice of the receptionist below that answered him. "A messenger from the government, sir."

"Damn the government! Tell them I'm dead."

"It's important, sir. Lor Haridin has returned from Sol and wants to see you."

Porus frowned. "Sol? What Sol? Oh, I remember. Send him up, but tell him to make it snappy."

"Come in, Haridin," he said a little later, voice calmer, as the young Arcturian, a bit thinner, a bit more weary than he had been six months earlier when he left the Arcturian System, entered.

"Well, young man? Did you write the paper?"

The Arcturian gazed intently upon his fingernails. "No, sir!"

"Why not?" Porus' green eyes peered narrowly at the other. "Don't tell me you've had trouble."

"Quite a bit, boss." The words came with an effort. "The psychological board itself has sent for you after hearing my report. The fact of the matter is that the Solarian System has . . . has refused to join the Federation."

Tan Porus shot out of his chair like a jack-in-the-box and landed, purely by chance, on his feet.

"What!?"

Haridin nodded miserably and cleared his throat.

"Now, by the Great Dark Nebula," swore the Rigellian, distractedly, "if this isn't one sweet day! First, they tell me that 'a' equals 'a,' and then you come in and tell me you muffed a Type A reaction—*muffed it completely!*"

The junior psychologist fired up. "I didn't muf it. There's something wrong with the Solarians themselves. They're not normal. When I landed they went wild over us. There was a fantastic celebration—entirely unrestrained. Nothing was too good for us. I delivered the invitation before their parliament in their own language—a simple one which they call Esperanto. I'll stake my life that my translation was ninety-five percent effective."

"Well? And then?"

"I can't understand the rest, boss. First, there was a neutral reaction and I was a little surprised, and then"—he shuddered in retrospect—"in seven days—only seven days, boss—the entire planet had reversed itself completely. I couldn't follow their psychology, not by a hundred miles. I've brought home copies of their newspapers of the time in which they objected to joining with 'alien monstrosities' and refused to be 'ruled by inhumans of worlds parsecs away.' I ask you, does that make sense?"

"And that's only the beginning. It was light years worse than that. Why, good Galaxy, I went all the way into Type G reactions, trying to figure them out, and couldn't. In the end, we *had* to leave. We were in actual *physical* danger from those . . . those Earthmen, as they call themselves."

Tan Porus chewed his lip a while. "Interesting! Have you your report with you?"

"No. The psychological board has it. They've been going over it with a microscope all day."

"And what do they say?"

The young Arcturian winced. "They don't say it openly, but they leave a strong impression of thinking the report an inaccurate one."

"Well, I'll decide about that after I've read it. Meanwhile, come with me to Parliamentary Hall and you can answer a few questions on the way."

JOSELIN ARN of Alpha Centauri rubbed stubbled jaws with his huge, six-fingered hand and peered from under beetling brows at the semicircle of diversified faces that stared down upon him. The psychological board was composed of psychologists of a score of worlds, and their united gaze was not the easiest thing in the world to withstand.

"We have been informed," began Friar Obel, head of the board and native of Vega, home of the green-skinned men, "that those sections of the report dealing with Sol's military state are *your* work."

Joselin Arn inclined his head in silent agreement.

"And you are prepared to confirm what you have stated here, in spite of its inherent improbability? You are no psychologist, you know."

"No! But I'm a soldier!" The

Centaurian's jaws set stubbornly as his bass voice rumbled through the hall. "I don't know equations and I don't know graphs—but I *do* know spaceships. I've seen theirs and I've seen ours, and theirs are better. I've seen their first interstellar ship. Give them a hundred years and they'll have better hyperatomos than we have. I've seen their weapons. They've got almost everything we have, at a stage in their history millennia before us. What they haven't got—they'll get, and soon. What they have got, they'll improve."

"I've seen their munitions plants. Ours are more advanced, but theirs are more efficient. I've seen their soldiers—and I'd rather fight with them than against them."

"I've said all that in the report. I say it again now."

His brusque sentences came to an end and Friar Obel waited for the murmur from the men about him to cease.

"And the rest of their science; medicine, chemistry, physics? What of them?"

"I'm not the best judge of those. You have the report there of those who know, however, and to the best of my knowledge I confirm them."

"And so these Solarians are true Humanoids?"

"By the circling worlds of Centauri, yes!"

The old scientist drew himself back in his chair with a peevish gesture and cast a rapid, frowning glance up and down the length of the table.

"Colleagues," he said, "we make little progress by rehashing this mess of impossibilities. We have a race of Humanoids of a superlatively technological turn; possessing at the same time an intrinsically unscientific belief in supernatural forces, an incredibly childish predilection to-

ward individuality, singly and in groups, and, worst of all, lack of sufficient vision to embrace a galaxy-wide culture."

He glared down upon the lowering Centaurian before him. "Such a race must exist if we are to believe the report—and fundamental axioms of psychology must crumble. But I, for one, refuse to believe any such—to be vulgar about it—comet gas. This is plainly a case of mismanagement to be investigated by the proper authorities. I hope you all agree with me when I say that this report be consigned to the scrap heap and that a second expedition led by an expert in his line, not by an inexperienced junior psychologist or a soldier—"

The drone of the scientist's voice was buried suddenly in the crash of an iron fist against the table. Joselin Arn, his huge bulk writhing in anger, lost his temper and gave vent to martial wrath.

"Now, by the writhing spawn of Templis, by the worms that crawl and the gnats that fly, by the cesspools and the plague spots, and by the hooded death itself, *I won't allow this*. Are you to sit there with your theories and your long-range wisdom and deny what I have seen with my eyes? Are my eyes"—and they flashed fire as he spoke—"to deny themselves because of a few wriggling marks your palsied hands trace on paper?"

"To the core of Centauri with these armchair wise men, say I—and the psychologists first of all. Blast these men who bury themselves in their books and their laboratories and are blind to what goes on in the living world outside. Psychology, is it? Rotten, putrid—"

A tap on his belt caused him to whirl, eyes staring, fists clenched.

For a moment, he looked about vainly. Then, turning his gaze downward, he found himself looking into the enigmatic green eyes of a pygmy of a man, whose piercing stare seemed to drench his anger with ice water.

"I know you, Joselin Arn," said Tan Porus slowly, picking his words carefully. "You're a brave man and a good soldier, but you don't like psychologists, I see. That is wrong of you, for it is on psychology that the political success of the Federation rests. Take it away and our Union crumbles, our great Federation melts away, the Galactic System is shattered." His voice descended into a soft, liquid croon. "You have sworn an oath to defend the System against all its enemies, Joselin Arn—and you yourself have now become its greatest. You strike at its foundations. You dig at its roots. You poison it at its source. You are dishonored. You are disgraced. You are a traitor."

THE CENTAURIAN soldier shook his head helplessly. As Porus spoke, deep and bitter remorse filled him. Recollection of his words of a moment ago lay heavy on his conscience. When the psychologist finished, Arn bent his head and wept. Tears ran down those lined, war-scarred cheeks, to which for forty years now they had been a stranger.

Porus spoke again, and this time his voice boomed like a thunderclap: "Away with your mewling whine, you coward. Danger is at hand. *Man the guns!*"

Joselin Arn snapped to attention; the sorrow that had filled him a bare second before was gone as if it had never existed.

The room rocked with laughter and the soldier grasped the situation.

It had been Porus' way of punishing him. With his complete knowledge of the devious ins and outs of the Humanoid mind, he had only to push the proper button, and—

The Centaurian bit his lip in embarrassment, but said nothing.

But Tan Porus, himself, did not laugh. To tease the soldier was one thing; to humiliate him, quite another. With a bound, he was on a chair and laid his small hand on the other's massive shoulder.

"No offense, my friend—a little lesson, that is all. Fight the sub-humanoids and the hostile environments of fifty worlds. Dare space in a leaky rattletrap of a ship. Defy whatever dangers you wish. But never, *never* offend a psychologist. He might get angry in *earnest* the next time."

Arn bent his head back and laughed—a gigantic roar of mirth that shook the room with its earthquake-like lustiness.

"Your advice is well taken, psychologist. Burn me with an atomo, if I don't think you're right." He strode from the room with his shoulders still heaving with suppressed laughter.

Porus hopped off the chair and turned to face the board.

"This is an interesting race of Humanoids we have stumbled upon, colleagues."

"Ah," said Obel, dryly, "the great Porus feels bound to come to his pupil's defense. Your digestion seems to have improved, since you feel yourself capable of swallowing Haridin's report."

Haridin, standing, head bowed, in the corner, reddened angrily, but did not move.

Porus frowned, but his voice kept to its even tone. "I do, and the report, if properly analyzed, will give

rise to a revolution in the science. It is a psychological gold mine; and Homo Sol, the find of the millennium."

"Be specific, Tan Porus," drawled someone. "Your tricks are all very well for a Centaurian blockhead, but we remain unimpressed."

The fiery little Rigellian emitted a gurgle of anger. He shook one tiny fist in the direction of the last speaker.

"I'll be more specific, Inar Tubal, you hairy space bug." Prudence and anger waged a visible battle within him. "There is more to a Humanoid than you think—certainly far more than you mental cripples can understand. Just to show you what you don't know, you desiccated group of fossils, I'll undertake to show you a bit of psycho-technology that'll knock the guts right out of you. Panic, morons, panic! World-wide panic!"

There was an awful silence. "Did you say world-wide panic?" stuttered Friar Obel, his green skin turning gray. "Panic?"

"Yes, you parrot. Give me six months and fifty assistants and I'll show you a world of Humanoids in panic."

Obel attempted vainly to answer. His mouth worked in a heroic attempt to remain serious—and failed. As though by signal, the entire board dropped its dignity and leaned back in a single burst of laughter.

"I remember," gasped Inar Tubal of Sirius, his round face streaked with tears of pure joy, "a student of mine who once claimed to have discovered a stimulus that would induce world-wide panic. When I checked his results, I came across an exponent with a misplaced decimal point. He was only ten orders of magnitude out of the way. How

many decimal points have you misplaced, Colleague Porus?"

"What of Kraut's Law, Porus, which says you can't panic more than five Humanoids at a time? Shall we pass a resolution repealing it? And maybe the atomic theory as well while we're about it?" and Semper Gor of Capella cackled gleefully.

Porus climbed onto the table and snatched Obel's gavel. "The next one who laughs is getting this over his empty head." There was sudden silence.

"I'm taking fifty assistants," shouted the green-eyed Rigellian, "and Joselin Arn is taking me to Sol. I want five of you to come with me—Inar Tubal, Semper Gor and any three others—so that I can watch their stupid faces when I've done what I said I would." He hefted the gavel, threateningly. "Well?"

Frian Obel gazed at the ceiling placidly. "All right, Porus. Tubal, Gor, Helvin, Prat, and Winsan can go with you. At the end of the specified time, we'll witness world-wide panic which will be very gratifying—or we'll watch you eat your words, and how much more gratifying *that* would be." And with that, he chuckled very quietly to himself.

TAN PORUS STARED thoughtfully out the window. Terrapolis, capital city of Earth, sprawled beneath him to the very edge of the horizon. Its muted roar reached even to the half-mile height at which he stood.

There was something over that city, invisible and intangible but none the less real. Its presence was only too evident to the small psychologist. The choking cloak of dank fear that spread over the metropolis beneath was one of his own weaving—a horrible cloak of dark uncertainty, that clutched with clammy

fingers at the hearts of Mankind and stopped short—just short—of actual panic.

The roar of the city had voices in it, and the voices were tiny ones of fear.

The Rigellian turned away in disgust. "Hey, Haridin," he roared.

The young Arcturian turned away from the televisior. "Calling me, boss?"

"What do you think I'm doing? Talking to myself? What's the latest from Asia?"

"Nothing new. The stimuli just aren't strong enough. The yellow men seem to be more stolid of disposition than the white dominants of America and Europe. I've sent out orders not to increase the stimuli, though."

"No, they mustn't," agreed Porus. "We can't risk *active* panic." He ruminated in silence. "Listen, we're about through. Tell them to hit a few of the big cities—they're more susceptible—and quit."

He turned to the window again. "Space, what a world—what a world! An entirely new branch of psychology has opened up—one we never dreamed of. Mob psychology, Haridin, mob psychology." He shook his head impressively.

"There's lots of suffering, though, boss," muttered the younger man. "This passive panic has completely paralyzed trade and commerce. The business life of the entire planet is stagnant. The poor government is helpless—they don't know what's wrong."

"They'll find out—when I'm ready. And, as for the suffering—well, I don't like it, either, but it's all a means to an end, a damned important end."

There followed a short silence, and then Porus' lips twitched into a nasty

smile. "Those five nitwits returned from Europe yesterday, didn't they?"

Haridin smiled in turn and nodded vigorously. "And hopping sore! Your predictions have checked to the fifth decimal place. They're fit to be tied."

"Good! I'm only sorry I can't see Obel's face right now, after the last message I sent him. And, incidentally—his voice dropped lower—"what's the latest on *them*?"

Haridin raised two fingers. "Two weeks, and they'll be here."

"Two weeks . . . two weeks," gurgled Porus jubilantly. He rose and made for the door. "I think I'll find my dear, dear colleagues and pass the time of day."

THE FIVE scientists of the board looked up from their notes and fell into an embarrassed silence as Porus entered.

The latter smiled impishly. "Notes satisfactory, gentlemen? Found some fifty or sixty fallacies in my fundamental assumptions, no doubt?"

Hybron Prat of Alpha Cepheus rumbled the gray fuzz he called hair. "I don't trust the unholy tricks this crazy mathematical notation of yours plays."

The Rigellian emitted a short bark of laughter. "Invent a better, then. So far, it's done a good job of handling reactions, hasn't it?"

There was an unmusical chorus of throat-clearings but no definite answer.

"Hasn't it?" thundered Porus.

"Well, what if it has," returned Kim Winston, desperately. "Where's your panic? All this is well and good. These Humanoids are cosmic freaks, but where's the big show you were going to put on. Until you break

Kraut's Law, this entire exhibition of yours isn't worth a pinhead meteor."

"You're beaten, gentlemen, you're beaten," crowed the small master psychologist. "I've proven my point—this passive panic is as impossible according to classic psychology as the active form. You're trying to deny facts and save face now, by harping on a technicality. Go home; go home, gentlemen, and hide under the bed."

Psychologists are only human. They can analyze the motives that drive them, but they are the slave of those motives just as much as the commonest mortal of all. These galaxy-famous psychologists writhed under the lash of wounded pride and shattered vanity, and their blind stubbornness was the mechanical reaction due therefrom. They knew it was and they knew Porus knew it was—and that made it all the harder.

Inar Tubal stared angrily from red-rimmed eyes. "Active panic or nothing, Tan Porus. That's what you promised, and that's what we'll have. We want the letter of the bond or, by space and time, we'll balk at any technicality. Active panic or we report failure!"

Porus swelled ominously and, with a tremendous effort, spoke quietly. "Be reasonable, gentlemen. We haven't the equipment to handle active panic. We've never come up against this superform they have here on Earth. What if it gets beyond control?" He shook his head violently.

"Isolate it, then," snarled Semper Gor. "Start it up and put it out. Make all the preparations you want, but do it!"

"If you can," grunted Hybron Prat.

But Tan Porus had *his* weak point.

His brittle temper lay in splintered shards about him. His agile tongue blistered the atmosphere and inundated the sullen psychologists with wave after wave of concentrated profanity.

"Have your way, vacuumheads! Have your way and to outer space with you!" He was breathless with passion. "We'll set it off right here in Terrapolis as soon as all the men are back home. Only you'd all better get from under!"

And with one last parting snarl, he stalked from the room.

TAN PORUS parted the curtains with a sweep of his hand, and the five psychologists facing him averted their eyes. The streets of Earth's capital were deserted of civilian population. The ordered tramp of the military patrolling the highways of the city sounded like a dirge. The wintry sky hung low over a scene of strewn wreckage, scattered bodies—and silence; the silence that follows an orgy of wild destruction.

"It was tough and go for a few hours there, colleagues." Porus' voice was tired. "If it had passed the city limits, we could never have stopped it."

"Horrible, horrible!" muttered Hybron Prat. "It was a scene a psychologist would have given his right arm to witness—and his life to forget."

"And these are Humanoids!" groaned Kim Winson.

Semper Gor rose to his feet in sudden decision. "Do you see the significance of this, Porus? These Earthmen are sheer uncontrolled atomite. They can't be handled. Were they twice the technological geniuses they are, they would be useless. With their mob psychology, their mass panics, their superemo-

tionalism, they simply won't fit into the Humanoid picture."

Porus raised an eyebrow. "Comet gas! Individually, we are as emotional as they are. They carry it into mass action and we don't; that's the only difference."

"And that's enough!" exclaimed Tubal. "We've made our decision, Porus. We made it last night, at the height of the . . . the . . . of it. The Solar System is to be left to itself. It is a plague spot and we want none of it. As far as the Galaxy is concerned, Homo Sol will be placed in strict quarantine. That is final!"

The Rigellian laughed softly. "For the Galaxy, it may be final. But for Homo Sol?"

Tubal shrugged. "They don't concern us."

Porus laughed again. "Say, Tubal. Just between the two of us, have you tried a time integration of Equation 128 followed by expansion with Karolean tensors?"

"No-o. I can't say I have."

"Well, then, just glance up and down these calculations and enjoy yourself."

The five scientists of the board grouped themselves about the sheets of paper Porus had handed them. Expressions changed from interest to bewilderment and then to something approaching panic.

Naru Helvin tore the sheets across with a spasmodic movement. "It's a lie," he screeched.

"We're a thousand years ahead of them now, and by that time we'll be advanced another two hundred years!" Tubal snapped. "They won't be able to do anything against the mass of the Galaxy's people."

Tan Porus laughed in a monotone, which is hard to do, but very unpleasant to hear. "You still don't believe mathematics. That's in your

behavior pattern, of course. All right, let's see if experts convince you—as they should, unless contact with these off-normal Humanoids has twisted you. Joselin—Joselin Arn—come in here!”

THE CENTAURIAN commander came in, saluted automatically, and looked expectant.

“Can one of your ships defeat one of the Sol ships in battle, if necessary?”

Arn grinned sourly. “Not a chance, sir. These Humanoids break Kraut's Law in panic—and also in fighting. We have a corps of experts manning our ships; these people have a single crew that functions as a unit, without individuality. They manifest a form of fighting—panic, I imagine, is the best word. Every individual on a ship becomes an organ of the ship. With us, as you know, that's impossible.

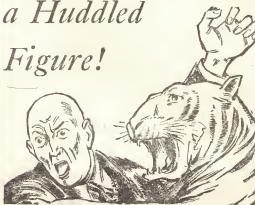
“Furthermore, this world's a mass of mad geniuses. They have, to my certain knowledge, taken no less than twenty-two interesting but useless gadgets they saw in the Thalsoon Museum when they visited us, turned 'em inside out, and produced from them some of the most unpleasant military devices I've seen. You know of Julmun Thill's gravitational line tracer? Used—rather ineffectively—for spotting ore deposits before the modern electric potential method came in?

“They've turned it—somehow—into one of the deadliest automatic fire directors it's been my displeasure to see. It will automatically lay a gun or projector on a completely invisible target in space, air, water or rock, for that matter.”

“We,” said Tan Porus gleefully, “have far greater flects than they. We could overwhelm them, could we not?”

Joselin Arn shook his head. “De-

A Giant Bengal Tiger Stood Astride a Huddled Figure!



● Slowly the tiger's head lowered. It growled meaningly. It opened its jaws to begin a meal. The huddled figure was that of “Splendid” Sheester, one of New York's able lawyers who should have been in Sing Sing years ago.

But how did “Splendid” get in the tiger's cage? Why were the tigers and other fierce jungle animals on the Long Island estate of Dr. Stepan Howell? What caused Dr. Howell's sudden death? Why was “The Angel” and his gang of murderous killers on the Howell estate that night?

The case baffled the police. Only The Whisperer, always ready to fight fire with fire, could solve it. In real life The Whisperer was “Wildcat” Gordon, New York's young Police Commissioner who, when the problem was too deep, assumed the disguise of “The Whisperer,” a denizen of the underworld, companion of crooks.

The exciting, strange, swift-moving stories of The Whisperer have been featured in THE SHADOW MAGAZINE. In answer to popular demand we now give this vital character a magazine of his own.

The WHISPERER

NOW ON SALE 10¢ A COPY

feat them now—probably. It wouldn't be any overwhelming, though, and I wouldn't bet on it too heavily. Certainly wouldn't invite it. The trouble is, in a military way, this collection of gadget maniacs invent things at a horrible rate. Technologically, they're as unstable as a wave in water; our civilization is more like a sanddune. I've seen their ground-car plants install a complete plant of machine tools for production of a new model of automobile—and rip it out in six months because it's completely obsolete!

"Now we've come in contact with their civilization briefly. We've learned the methods of one new civilization to add to our previous two hundred and eighty-odd—a small percentage advantage. They've added one new civilization to their previous one—a one-hundred-percent advance!"

"How about," Porus asked gently, "our military position if we simply ignore them completely for two hundred years?"

Joselin Arn gave an explosive little laugh. "If we could—which means if they'd let us—I'd answer offhand and with assurance. They're all I'd care to tackle right now. Two hundred years of exploring the new tracks suggested by their brief contact with us and they'd be doing things I can't imagine. Wait two hundred years, and there won't be a battle; there'll be an annexation."

Tan Porus bowed formally. "Thank you, Joselin Arn. That was the result of my mathematical work."

Joselin Arn saluted and left the room.

Turning to the five thoroughly paralyzed scientists, Porus went on: "And I hope these learned gentlemen still react in a vaguely Human-

oid way. Are you convinced that it is not up to us to decide to end all intercourse with this race? We may—but they won't!

"Fools"—he spat out the word—"do you think I'm going to waste time arguing with you? I'm laying down the law, do you understand? Homo Sol *shall* enter the Federation. They are going to be trained into maturity in two hundred years. And I'm not asking you; *I'm telling you!*" The Rigellian stared up at them truculently.

"Come with me!" he growled brusquely.

THEY FOLLOWED in tame submission and entered Tan Porus' sleeping quarters. The little psychologist drew aside a curtain and revealed a life-size painting.

"Make anything of that?"

It was the portrait of an Earthman, but of such an Earthman as none of the psychologists had yet seen. Dignified and sternly handsome, with one hand stroking a regal beard, and the other holding the single flowing garment that clothed him, he seemed personified majesty.

"That's Zeus," said Porus. "The primitive Earthmen created him as the personification of storm and lightning." He whirled upon the bewildered five. "Does it remind you of anybody?"

"Homo Canopus?" ventured Helvin uncertainly.

For a moment, Porus' face relaxed in momentary gratification and then it hardened again. "Of course," he snapped. "Why do you hesitate about it? That's Canopus to the life, down to the full yellow beard."

Then: "Here's something else." He drew another curtain.

The portrait was of a female this time. Full-bosomed and wide-hipped

she was. An ineffable smile graced her face and her hands seemed to caress the stalks of grain that sprang thickly about her feet.

"Demeter!" said Porus. "The personification of agricultural fertility. The idealized mother. Whom does that remind you of?"

There was no hesitation this time. Five voices rang out as one: "Homo Betelguese!"

Tan Porus smiled in delight. "There you have it. Well?"

"Well?" said Tubal.

"Don't you see?" The smile faded. "Isn't it clear. Nitwit! If a hundred Zeuses and a hundred Demeters were to land on Earth as part of a 'trade mission,' and turned out to be trained psychologists—*Now* do you see?"

Semper Gor laughed suddenly. "Space, time, and little meteors. Of course! The Earthmen would be putty in the hands of their own personifications of storm and motherhood come to life. In two hundred years—why, in two hundred years, we could do anything."

"But this so-called trade mission of yours, Porus," interposed Prat. "How would you get Homo Sol to accept it in the first place?"

Porus cocked his head to one side. "Dear Colleague Prat," he murmured, "do you suppose that I created the passive panic just for the show—or just to gratify five wood-heads? This passive panic paralyzed industry, and the Terrestrial government is faced with revolution—another form of mob action that could use investigation. Offer them Galactic trade and eternal prosperity and do you think they'd jump at it? Has matter mass?"

The Rigellian cut short the ex-

cited babble that followed with an impatient gesture. "If you've nothing more to ask, gentlemen, let's begin our preparations to leave. Frankly, I'm tired of Earth, and, more than that, I'm blasted anxious to get back to that squid of mine."

He opened the door and shouted down the corridor: "Hey, Haridin! Tell Arn to have the ship ready in six hours. We're leaving."

"But . . . but—" The chorus of puzzled objections crystallized into sudden action as Semper Gor dashed at Porus and snatched him back as he was on the point of leaving. The little Rigellian struggled vainly in the other's powerful grasp.

"Let go!"

"We've endured enough, Porus," said Gor, "and now you'll just calm down and behave like a Humanoid. Whatever you say, we're not leaving until we're finished. We've got to arrange with the Terrestrial government concerning the trade mission. We've got to secure approval of the board. We've got to pick our psychologist. We've got to—"

Here Porus, with a sudden jerk, freed himself. "Do you suppose for one moment that I would wait for your precious board to start to begin to commence to consider doing something about the situation in two or three decades?"

"Earth agreed to my terms unconditionally a month ago. The squad of Canopans and Betelguesans set sail five months ago, and landed day before yesterday. It was only with their help that we managed to stop yesterday's panic—though you never suspected it. You probably thought you did it yourself. Today, gentlemen, they have the situation in full control and your services are no longer needed. We're going home."

THE CORONAVISER

By Stanley R. Short

Electronics Engineer

An electronics engineer tells how the electronic telescope has finally become reality—with a special slant. Also, the new apparatus promises to invade a hundred other fields.

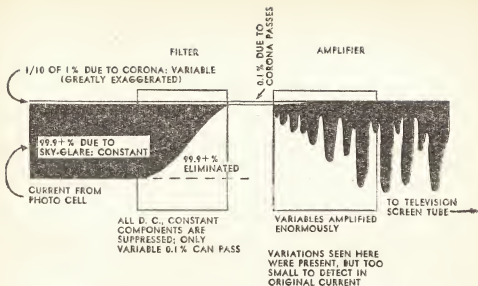
IN the fifth year of the reign of Chung K'ang, the fourth emperor of the Hsai dynasty in ancient China, there was visible in China a total eclipse of the Sun. From the "Annals of the Bamboo Books," written about three hundred years before Christ, and from that Chinese classic, the "Shu Ching," one can piece together a fairly complete story of what happened. It was a bright day in October and as the Moon encroached farther and farther onto the solar disk the panic and dismay of the common people built up in a gigantic crescendo. For could they not see with their own eyes the devouring of the life-giving Sun by this sinister monster?

As the confusion increased, the wrath of the emperor knew no bounds. Where were his royal astronomers, Hsi and Ho, who should have been busy shooting arrows, beating drums and otherwise performing the customary rites to scare away this monster. Alas for them they were both drunk and blissfully unaware of the emergency. When the eclipse was over, the emperor ruled that they should be found and that their heads be chopped off. For the Chinese law regarding eclipses was written: "Being before the time, the astronomers are to be killed without respite; and being behind the

time, they are to be slain without reprieve."

So runs the story of the first solar eclipse of which there is any record. But there have been many eclipses since then, and as man has learned the reasons for their being and how to predict them, his attention has turned to a study of that magnificent pearly white halo seen around the eclipsed Sun, the solar corona. Since it can be observed only at eclipses, less is known about it than of other solar phenomena such as the sunspots, the flaming hydrogen prominences that project from the edge of the disk, and the clouds of bright and dark gases that hover over its surface and are known as the flocculi.

In 1878 it became evident to Dr. Huggins, one of the ablest astronomers of that day, that to learn more of the corona one must be able to observe it in full sunlight; i. e., without waiting for an eclipse. Unfortunately, there was not available to him the remarkable optical techniques which we have today, particularly the technique of television which seems destined to play the important role in coronal observations. Huggins screened out the solar disk in his telescope and made many photographs of the sky around it, hoping thus to record the image of the



corona which he knew was in this region. The glare around the solar orbit, however, was so bright that his plates were completely blackened before the exposures had run long enough to record an image as faint as the corona.

Huggins' name, great in the annals of astronomy, gave prestige to the problem and his work was followed in later years by many of the top-flight scientists of their day. The stories of these attempts to "see the invisible" would fill a most interesting volume. As each scientist thought of a new method to try he would spend many days developing the apparatus in the laboratory, checking over his calculations and perfecting the equipment to the last detail. Then, when all was in readiness, the enthusiastic, though laborious, ascent to Pikes Peak, to Mount Etna, or to some other high mountaintop would begin with the heavy telescopes and other apparatus being carried over the last few miles to the summit on the scientists' backs through the snow. Next followed the setting up of the equipment, the

waiting for an exceptionally clear sky through which to work, the careful manipulation of the apparatus, often at very low temperatures, and then finally the result; invariably the same, complete failure. With heavy hearts the party would descend to the laboratories to wonder why they had failed.

In this way every conceivable optical means was exhaustively tried—bolometers, polariscopes, thermocouples, spectroscopes, infrared and ultraviolet filters—and the end was not yet in sight even though textbook writers had begun to state that the problem was impossible of solution, that the invisible could not be seen.

So it was in 1929. In that year a young French astronomer by the name of Bernard Lyot had the temerity to consider another attack on this problem. He had just developed a polariscope of greater power than man had ever made before, and in his enthusiasm went to the late Professor H. O. Barnard, director of the Colombo Observatory

at Ceylon, with his idea. The professor knew him to be unusually able as an experimenter and did not discourage him from the attempt.

Lyot in his thoroughness laid the groundwork as it had never been done before. He was not content simply to rely on his exceptional polariscope; he wanted to make sure that his telescope was as fine as could be procured for the job, and it was this latter precaution, rather than his polariscope, that gave him some measure of success where all had failed before. For in investigating the sources of glare in his telescope he discovered the major reason for the other failures, namely that the glare around the disk, due to scattering in the telescope itself, was hundreds of times brighter than the corona and thus rendered it entirely invisible.

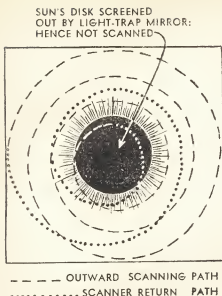
As a result of these studies he devised the coronographe, a telescope of complex design in which this kind of glare was eliminated. He lined it with thick crankcase oil to prevent dust from crossing the light beam and made the lens removable so that it could be carefully cleaned at frequent intervals. The coronographe turned out to be vastly more important than his polariscope.

When it had been developed to its final form, he and his assistants carried it in sections on their backs to the summit of Mount Pic du Midi in the Pyrenees Mountains in southern France, where the altitude is over eight thousand feet, and there waited for a sky of remarkable clarity. Such a day occasionally followed a heavy snowfall, which would carry down the smoke and dust in the atmosphere. There were a few such days during the summers of the next few years and on several of these he observed and photographed not only the red flaming prominences but also

the inner corona. During the last few years he has taken moving pictures of the prominences, by photographing once every half minute or so and projecting the film at regular speed. The fiery tornadoes thus obtained present remarkable spectacles with motions unlike anything seen on Earth. For this work he received the gold medal of the Royal Astronomical Society of England.

But the problem of the outer corona and of day-to-day observations of it still remained without solution. Moreover, Lyot's photographs of the inner corona were lacking in contrast. A still better method was needed, a method powerful enough to reach through the glare around the Sun and bring out the coronal image which is relatively so faint as to be completely invisible under these conditions. One would naturally expect that the solution of this problem would come from one of the big observatories and not from a commercial laboratory, but surprisingly enough the method did come from this latter source, and the reason why scientists engaged in more commercial pursuits should be interested in this problem is a story in itself.

APPLIED PHYSICS, chemistry, geology and other applied sciences are familiar terms, but not so applied astronomy; one seldom thinks of astronomy as anything but a pure science. There is one field of engineering, however, in which astronomy has begun to play an important role and that is in the domain of electrical communication, i. e., the field of telephony, telegraphy and radio. Wherever man transmits messages or signals between distant points on the Earth's surface he encounters disturbances which have their origin in the Sun,



and to fully understand the nature of these disturbances and to predict their occurrence he must understand the solar phenomena which give rise to them.

Some years ago an ingenious experiment was carried out which threw a good deal of light on this solar-terrestrial relationship. An iron sphere was magnetized so that it had a north and south pole similar to those of the Earth. It was mounted in a large box in which the pressure could be diminished to correspond with that in the upper atmosphere and electrons were shot at it. There appeared around the north and south poles miniature auroras exhibiting the curtains, streamers and other familiar forms of the aurora borealis and australis, leaving no doubt that here indeed was the mechanism by which the terrestrial phenomena were produced.

Further work has established the fact that the upper atmosphere is in a highly ionized state, similar to that of the gas in the tubular neon signs that adorn the main streets of our

cities and towns, and also the fact that the major causes of this ionization come from the Sun. During the periods of great disturbances of this ionization there are a number of effects: the aurora shines out with unusual brilliance, the compass needles wander slightly from their true positions, giving rise to the term "magnetic storm," electric currents—sometimes strong enough to melt telephone or telegraph wires—are set up in the Earth's crust and radio transmission through or near the auroral zones suffers a blackout.

From a study of these phenomena it is definitely established that the seat of the trouble is truly to be found in the Sun and often one finds a huge sunspot on the Sun at the time of the disturbance. But not always—and this eliminates these spots as the primary cause of the trouble, though they are related to it. In a similar manner it has been found that the bright clouds on the solar-surface, the faculae, the prominences and the flocculi are each related to the unknown form of solar activity that is responsible for the terrestrial effects, but that none is the unique cause of them.

The corona cannot be studied in this connection, since there is so little data on it, but there are a number of reasons for believing that its activity may be the real clue that leads to the solution. The terrestrial disturbances act very much as if the Sun, as it turns, were shooting out a more or less steady stream of particles, much as one might turn around holding a garden hose from which a stream of water were issuing. On each revolution the stream would intersect the Earth and because of the latter's magnetic field the charged particles of the stream would be guided toward the polar regions of the atmosphere, there to

produce the auroras. In addition the shapes of the coronal streamers fit in with this hypothesis very well. Of all things solar, they seem to be the most likely cause of the terrestrial phenomena.

When the communication channels are interrupted, the inconveniences that result are often very costly and thus the engineer, in attempting to improve the reliability of his circuits, is confronted with the solar problem. The television method for viewing the corona and the machine by which it was made feasible, known as the coronaviser, was invented by Dr. A. M. Skellett of the Bell Telephone Laboratories with the hope that by its means, ultimately, the reliability of long-distance transmission both by wire and radio might be enhanced through a fuller knowledge of the relationship between the streamers of the corona and the Earthly disturbances.

To propose the method was one thing, but to put it into practice was an entirely different matter. For instance, a good telescope with a steady mount was needed and New York City was hardly the place to find such an instrument. For another thing there was no television scanner that was suitable for the job. The rectangular scanning pattern in general use could not be used; the scanning must be done in a spiral path, i. e., in polar co-ordinates.

The problem of a suitable telescope and mounting was solved with the offer by Dr. Gustavus W. Cook, the owner of the world's finest privately owned observatory at Wynnewood, Pennsylvania, of the use of his fifteen-inch horizontal telescope. This instrument has a tube eighteen feet long, connecting two buildings. The first one houses the double lens, fifteen inches in diameter and a large

plane mirror by which the light from the celestial object is reflected into this lens. The other building houses the eyepiece, which is at eye level and stationary, so that an observer may watch a celestial body with the greatest ease and comfort, the latter being assured by an adequate heating system in this latter room. By the manipulation of push buttons the telescope may be "pointed" at any object in the sky.

Wynnewood is a suburb of Philadelphia, near enough to the city to be easily accessible yet far enough from it and on ground sufficiently high so that the dust and smoke of the city are not very troublesome. The observatory is located on Dr. Cook's estate and has one of the most beautiful settings of any observatory in the world, surrounded as it is by flowers and shrubs of many kinds and with a lily pool at its door. The suitability of this particular telescope for the work lies in the fixed position of the eyepiece end, for thus the scanning equipment, which is somewhat cumbersome, may be rigidly mounted and does not have to swing around at the end of a long tube, as would be the case with an ordinary telescope. Furthermore, this size of lens is about as large as could be used, since the heat at the focus due to the Sun's image is just about as much as can be taken care of. A fifteen-inch lens is indeed a powerful burning glass.

The problem of the scanner was a real one. It would have been easy to direct the electron beam of an iconoscope—the usual television scanner—in a spiral path, but the uniformity of the sensitivity of the photoelectric surface would be far from adequate for the job, since the method demands that the sensitivity of the input scanner be absolutely uniform over all the scanned field.

This consideration eliminated at once all forms of electron scanning, and there was left only the old-fashioned mechanical methods in which the light from every point of the field falls on the same portion of a photoelectric surface.

A design was finally worked out and built, which scanned the image of the sky around the Sun in a spiral path—the lines of the spiral being close to one another so that the field was completely covered. It consisted, essentially, of a plano-convex lens, silvered on the back so that it acted like a concave mirror, mounted on a motor shaft with associated apparatus to make it rock while it rotated. This combination of whirling and rocking motion gave the required spiral scan and diverted the light from the different points in the field into the scanning aperture—a round hole about one twenty-fifth of an inch in diameter. After passing through the scanning hole the light entered the photoelectric cell. A complete description of this scanner may be found in the *Bell Laboratory Record* for February, 1940.

The images could have been transmitted as far as one might wish, but it was convenient to place the reproducer—a cathode-ray tube similar to those in use in television—across the room where it could be readily seen by the operator. The important principle in this method is not the ability to transmit the images over long distances, but the means that are afforded by the technique of television to separate the coronal image from the glare in the sky and telescope. Let us see how this is accomplished.

WHEN one looks at the field to be scanned, i. e., the region of the sky image around the Sun, he sees no detail; the glare is very uniform; so

that, as the scanning spot travels around, the photoelectric current is very steady in magnitude. It is essentially a direct current. There is, however, an extremely small ripple in this current due to the variation of light as the spot passes over the light and dark parts of the corona, even though these are invisible, and this ripple corresponds to an alternating current. It is more than a thousand times weaker than the direct current, but in spite of this great difference in *amplitude* it is a simple matter to separate the *types* of current—direct current from the alternating—and to amplify the latter alone, discarding the former entirely.

The amplified alternating currents contain all the detail of the corona, and after they have been increased in strength by about a million times, they are used to reproduce the corona as seen at an eclipse. That is the essence of the method; the glare gives rise to a direct current and the coronal image to an alternating one, so that these two images may easily be separated while in the electrical state and the unwanted one discarded before final reproduction.

One important question, that arose early in the work, was how to tell if the apparatus were sensitive enough to pick up and reproduce an image as faint as the corona. Measurements and calculations are not very reliable in such a case, particularly since the loss of light through the complicated optical system of the scanner and telescope could not be readily determined. The question was answered by transmitting the Moon through the apparatus. The Moon is just about as bright as the corona and when it is full it has a surface brightness a little greater than the coronal intensity. When at half moon, because of the rugged and mountainous nature of its surface, it reflects

to the Earth about half as much light as one gets from a corresponding portion of the solar halo.

It was found that on some days brilliant wisps of light would float across the reproducing screen; sometimes they would appear one at a time, but on other occasions whole flocks would drift by. On close inspection these wisps had the form of angels' wings and were, in fact, referred to by the observers as "angels." Careful inspection of the telescope tube and scanner, while they were floating by, revealed nothing and rushing outside to peer in the sky in the direction of the Sun was likewise unsuccessful in identifying them. They were sometimes so bright that they paralyzed the television apparatus and it became impossible to work with them. It seemed impossible that anything which gave such a strong signal could not be seen, but the sensitivity of the apparatus was so great that this was the case.

Identification finally came one day late in the afternoon when the Sun was low in the sky so that the observer might look almost toward it against a dark background. Under these conditions small insects and wind-blown seeds could be seen drifting toward the shaft of light connecting the Sun and the apparatus. Being illuminated by full sunlight, they scattered enough light in the direction of the telescope to give a bright diffraction pattern which had the peculiar shape referred to above.

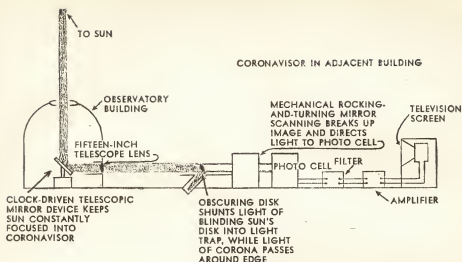
In most observatories the large lenses of the telescopes are seldom cleaned, an occasional wiping with a very soft cloth or camel's-hair brush being considered sufficient. It is not uncommon to find a lens that has not been taken apart and cleaned for a period of several years. With

this work, however, extreme cleanliness of the optical parts was absolutely necessary and they were frequently washed and dried with the most painstaking care.

The sky likewise had to be clean, that is, free from haze and smoke and from those feathery wisps of cirrus clouds that form at great heights in the atmosphere. This, of course, limited the times for working with the apparatus severely, for in the vicinity of Philadelphia a really clear sky is not very common. Best skies were had after a rain or snowfall when the dirt in the air was carried down to the Earth.

The first results with the instrument were some images that were obtained of prominences. These are brighter than the corona and are easily recognizable by their form, but as the work progressed the images began to show details that could only be identified with the corona. On one day an unusually bright flare in the corona was watched for several hours and a number of photographs of it were taken as it appeared on the television screen. These results are enough to prove the method and the device, but the ideal place for its use is at an observatory on the top of a high mountain where skies are clear most of the time. Such a place is the summit of Mount Locke in Texas where the great eighty-two-inch telescope is located. Here at the McDonald Observatory the coronaviser will be put into operation under the ideal conditions that prevail.

ONE is tempted to speculate on the future use of this instrument. It will, of course, find its place among other astronomical instruments, and it is to be expected that routine observations of the corona will furnish the astrophysicists with new data



and stimulate new theories and hypotheses. But in addition to this there is the very real hope that by means of coronal observations we may some day be able to predict the electrical disturbances in the upper atmosphere, or ionosphere, that are responsible for the interruptions in long-distance communication.

It would be ideal for this kind of work to keep the corona under continuous observation and this could be done with coronavisers located at strategic points all around the Earth. Thus as one observatory found the Sun getting too low in the sky for best results, others in the succeeding longitude zones would take up the vigil, so that at all times there would be one or more observatories on the sunlit side of the Earth keeping watch.

Now the television technique of the coronaviser might be taken advantage of in keeping the observatories in touch with one another and with a central station, for the images could not only be viewed at the observing position but could be sent by radio clear around the world. Since the range of frequencies needed to

transmit one of the coronal images is very much less than that needed for television, the long-distance short-wave channels now in operation could handle them without difficulty.

Thus at one or more positions on the Earth it would be possible to observe the corona continuously, and an "ionosphere weather bureau" might be set up which would be enabled to send out its predictions of radio and wire transmission in much the same way that the weather bureau of today broadcasts its forecasts.

Let me point out that a similar program of continuous observation of the Sun is in operation at the present time, lacking only the actual continuous transmission of images by television that could be accomplished by the coronaviser. Spectrohelioscopes and solar telescopes are located at different observatories around the world—America, England, Italy, U.Krainia, Syria, Crimea, Turkestan, India, Australia, Peru and a number of other places—and while you are reading this, there is an observer somewhere on the face

FLIGHT CALCULATOR



FREE!

● This Flight Calculator is an inexpensive copy of an expensive instrument. Made up of celluloid, it sells in the better shops, for \$2.00 and upward.

We had a copy made on inexpensive but sturdy stock and are offering it absolutely free with each copy of AIR PROGRESS. Every aviation fan should have his copy for it contains hundreds of photographs, many pages in full color, especially mounted for framing; air personalities; the language of flying; detailed drawings and many other new and unique features.



AIR PROGRESS
Dept. S-A
79 Seventh Avenue
New York, N. Y.

Here is my quarter. Kindly mail me AIR PROGRESS and one Flight Calculator.

NAME

ADDRESS

CITY STATE

of the Earth who is intently watching the activity on the Sun. Duplication of observatories in the various zones greatly reduces the amount of time lost to the program because of poor weather.

Another accomplishment that this instrument seems destined to fulfill is the production of moving pictures of coronal activity. The play of the streamers, like those of the northern lights, the boiling and fuming activity near the Sun's face, and all of the other now-unknown kinds of motion of which the corona is believed to partake, will present moving pictures of such gigantic spectacles as the imagination of man has never heretofore conceived. The television image would be photographed by the movie camera at very slow speed—that is, one frame every half minute or so—and when shown, run at the normal speed of twenty-four frames per second, for the speed of activity in the Sun's atmosphere, though measured in velocities which make a rifle bullet seem only to creep along, appear at the Earth's distance so slow that only by the speed-up afforded by moving-picture technique can the actual motion be observed as such.

BOILED DOWN to its essentials, the principle on which the coronaviser is based is simply a means of increasing contrast in an image. A photograph taken through haze or fog has very little contrast while one taken in sunlight, that shows deep shadows, has a good deal of contrast. This new principle enables one to enhance or increase contrast in an image to a much greater extent than anything heretofore devised. It should, therefore, have a more general application; let us see what some of these applications might be.

An obvious one would appear to be the use of this technique to see farther through fog. While undoubt-

edly such a use is entirely practical, it does not seem likely that a device based on this idea would be worth much. The reason is that fog is exceedingly opaque, and while one could indeed see farther through haze, what is really needed is a method which eliminates the effect of the fog entirely so that unobstructed vision over distances of miles rather than feet would be possible.

A more promising application lies in the field of X rays. Here, a means of increasing contrast is sorely needed, for many objects in the body do not absorb these rays well enough to cast a well-defined shadow on the fluorescent screen or photographic plate.

The stomach and intestinal tract are good examples, but for these a means is at hand by which their form may be revealed. This is accomplished by having the patient eat certain compounds of bismuth which have great opacity to X rays and which thus can be made to reveal the form of the organ which they fill. But for the lungs, the heart and many other organs no simple technique is available. The television method of contrast enhancement would greatly extend the range of observation for such organs and would enable an earlier diagnosis of many diseases. Particularly does this appear to be true of cancer, for by the time a cancer has developed far enough to give an image with X rays it is too far along for effective treatment.

There are certain compounds, particularly some iodides, which have an affinity for cancer cells and when injected into the blood will concentrate in the affected area. These compounds are more opaque to X rays than human tissue or cancer cells and will give an image of the

cancer, but in the early stages of the disease these images are too faint to be seen, even though present. A really effective amplification of contrast would make them visible so that a diagnosis could be made at the early stages of the affliction when treatment is really effective.

TO APPLY the method to X rays presents some difficult problems, but none that would seem to be insurmountable. Some years ago the French scientist Dauvillier actually succeeded in scanning a body by X rays and in transmitting and reproducing the image by television. Of course, the quality of his images was poor compared with present-day standards, but he did show that the idea of televising by X rays is feasible. He used a Nipkow lead scanning disk of the kind that was first employed in television. It had a spiral row of holes and for each revolution scanned the entire area. Such disks are no longer used, although mechanical scanning is by no means obsolete.

A mechanical scanner for X rays would probably be quite different in design from any available at present, for X rays cannot be focused and reflected by lenses and mirrors of the ordinary kind. One possible solution lies in the recording of the X-ray image photographically as at present and then by television of the resultant negative to pull out the hidden details by the television method. This would require much more uniform development of the negative than that ordinarily attained and in addition the plate itself would have to be equally sensitive over all portions of its surface.

Microscopy is another possible field of application. By this method of contrast increase, the necessity for staining biological specimens

would be eliminated. For example, the bacillus of tuberculosis would be instantly visible without the need for staining with red dye as at present. The advantage for the microscopist is an important one; in many cases he would not have to kill the specimen in order to dye it, and possible alterations which are due to the dye itself would be eliminated. Dyes can only be used where their affinity for the bacillus or other organism to be studied is considerably greater than it is for the surrounding medium. The finding of a dye with these properties is usually difficult and often impossible. There can be little doubt that an instrument based on these principles would be of great value.

It is quite possible that there are new kinds of bacilli and possibly many viruses which could be observed with this method. There is no means available at present by which a virus may be seen.

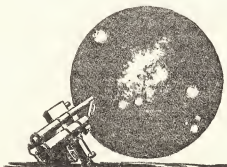
Here, as with X rays, there are difficulties to be overcome. Probably the greatest of these is the heating of the specimen by the tremendous intensity of light that would have to be passed through it. For the magnification of an optical image results in a corresponding decrease in brightness, since the same

illumination must be spread over a much greater area. There are, however, heat-reducing screens and filters which would be suitable for this problem.

So one might consider the various fields of optical instruments and speculate on the application of this principle of increasing contrast: in criminology, the detecting of fingerprints and clues of various kinds which are invisible by present optical methods; in ordinary photography for photographs through haze or for reproduction at greater contrast than the original; and in spectroscopy where unseen lines in spectrographs may be made visible.

It has usually been true that whenever man has devised a means of pushing back the boundaries of knowledge and experience, he has discovered new truths and useful facts. Television is in its infancy and its technique has just begun to take on a definite form. We may expect in the years to come that tremendous advances will be made and that present-day results will look primitive and amateurish. We may also expect at the same time that the development of the technique will branch out into the fields here outlined, so that what is invisible today may readily be seen tomorrow.

THE END.





EMERGENCY

By Vic Phillips

*Very crude apparatus can be very deadly—
if the right way to apply it can be found!*

Illustrated by R. Isip

WARD KANE, chief liaison officer for the board, took his place at the council table with the board of governors of Earth State. They were all there, huge, gray-haired Myron Stott and Pindar Brindisi, co-directors of the American Tecnotes; Harold Negutchi, director; and Li Chang, chief of staff of the Asia di-

vision; Lionel Standard, powerful, enigmatic, imperturbable, ginger-haired governor of the Euro-African Federation and his silently effective, unobtrusive chief of staff, Ivan Stalski, and finally Jean Bernard, president of the Southern Hemisphere board of control, the great bulk of him, his fullish lips and dark, quiet

eyes revealing proudly the line of ancient Polynesian kings and wild Gaelic adventurers from which he had sprung. The one thing these men had in common was the concealed tensely of suspense with which they waited for Ward to make his report. He stood up, a tall, lean, black-haired North American, his body sun-bronzed and copper-gold.

"This is the latest report from the communication sequence," he stated. "At three hundred and ten hours, eleven communication-sequence stations from Pluto to Jupiter ceased broadcasting. Tight beam, super-penetrant transmissions of fourteen billion kilowatts failed to bring any reaction. Harmon recoil circuits were established with all points, but they were not interrupted by any emergency calls or any type of power transmission whatever. At three hundred and twelve hours, Callisto and Gannymede stations suspended operations almost simultaneously after they had informed us that they could get no response from, or detect anything abnormal in, the Jupiter stations other than their silence.

"In every case the transmission has faded out, indicating declining power delivery. Apparently no violence has occurred, no alarms have been given. Stations on Ceres and Pallas were warned, and every precaution was taken against sabotage, it being possible that the central power broadcasting units on the outer planets had been tampered with. Pallas reported to Ceres that with their generating units guarded so completely as to eliminate the possibility of all known outside interference, their power transmissions started to fade out with the generators running at full capacity. This indicates that the power transmission is being blanketed in some way. The generators themselves continued

normal operation. At four hundred hours, signals from both Ceres and Pallas had become so faint as to be undetectable by any of the Mars stations.

"Mars is making all preparations possible in the light of present knowledge to prevent a similar suspension of radiant-power transmission. The automatic recorders of the defense system proximity gauges reported a very slight activity just previous to the extinguishing of Pluto, and similar activity of a very low order in connection with the fading out of the other outer planets. Immediately preceding the extinguishing of Callisto and Gannymede, the activity of the gauges was very slight, and in the case of Pallas and Ceres the disturbance was almost undetectable. The proximity gauges may have been reacting to normal activity of wandering comets, but all these activations of the gauges have been in direct proportion to the power capacity of the generating stations involved.

"Our probability integrators indicate, as a probability of the third order, that the blanketing of the power transmission facilities of the outer planets was brought about by some body that has been successively in the vicinity of all the planets involved. This body is traveling toward the Sun, losing speed and volume in direct relation to the power plants that have been silenced. Mars is next, and is prepared, as far as possible, for the crisis, which is expected within a few minutes. The course of this object reveals that it is taking the shortest routes between objectives and, if Mars is silenced on schedule, it is estimated that the crisis on Earth will follow six hours later, owing to our present orbital position. Mars will maintain communication as long as possible, and

will forward us all pertinent information."

Having finished, Ward sat down to await further instructions. The council received the report in silence. It wasn't news; it was just the latest summing up of the incredible situation that had revealed itself hours before in the abrupt, unexplained fading out of signals from Pluto.

Jean Bernard was the first to speak. "If we are to be confronted with a situation that includes the suspension of our radiant-power broadcasting stations, I suggest that we immediately curtail consumption of all foods, and that we commence to store the surplus, this activity to be carried on as long as our power transmission will operate."

There was a general nodding of heads as the board of governors approved this practical measure without dissent.

Ward smiled to himself as his fingers crawled rapidly over the contact faces of the communicator by which he transmitted the wishes of the board of governors to the outside world without disturbing the decorum and tranquillity of the council chamber. The big Polynesian could be trusted to think first of the Earth's provisioning.

Ten seconds after Ward finished his communication, the entire Earth was placed in a state of emergency. It was done smoothly and effortlessly, in accordance with plans long perfected against just such an occasion. The population was not alarmed; the great majority would know nothing of the state of affairs till their next meal, when the rationing would go into effect.

WARD SAT AND waited for something else to happen. Even yet he couldn't bring himself to believe

that some type of imponderable disaster was coming closer to the Earth with every passing minute. It had happened too fast, utterly without warning. He knew he should feel something, fear, perhaps, or uncertainty, but he hadn't had time yet. There had been no uncertainty or hesitation in the routine assembling of the governors. Every possible emergency conceivable had been provided against long ago, and general orders and instructions for behavior designed to cope with any contingency not covered specifically had been on hand for decades. They were operating in accordance with these latter now. There were still things to be done. They had not yet reached the helpless waiting stage that Ward knew must come. It had to come; once their routine preparations were made, there was nothing further they could do without more information. Would the Mars stations be able to give it to them before they, too, were engulfed in the terrifying mystery of silence that was sweeping over the Solar System from outer space?

Myron Stott cleared his throat and spoke in his deep, rumbling voice:

"Could this object be a fleet of ships successively establishing control over the planets and leaving some behind to maintain it?" he inquired.

"Or perhaps a single unit, leaving parts of itself and its power behind as it progresses and decelerates," Lionel Standard offered.

They were just guessing, groping blindly, but there was no hint of panic. The silencing of the outer planets had been so swift and complete that the inner planets knew nothing on which to base a fear.

No one answered Stott; they weren't expected to. Ward relayed

the two propositions through his communicator to the probability integrators. A few seconds later he announced the result.

"It is indicated, as a probability of the seventh order, that the object is a single unit, leaving parts of itself and its power behind as it decelerates toward the Sun," he stated. Before anyone could offer any comment, Ward spoke again in response to the impulses that came in through his fingers from the contact surfaces of the communicator.

"The probability has been raised to the second order by addition of information from a Mars station. The concentration of the object's power and its comparatively small mass indicates that its control is highly centralized. Patrol ships sent out to contact it have ceased to report. No metals could be detected in its composition, complete analysis will follow." The analysis started with a statement of the position and mass of the object, also its speed and direction, but got no further. "Signals from the Mars station have been cut off," Ward finished.

There followed another long silence in the council chamber, and some way, during the interval, a tincture of primitive fear from out of the ancient past filtered into the great room. It was a long time since humanity had come up against something it could not understand.

Pindar Brindisi spoke. "We have six hours," he said.

"And our defense forces, what of them?" Negutchi inquired.

"They will be helpless without the central power stations," Lionel Standard answered. "Their emergency liquid-fuel power cannot operate at the range from which this invader seems to be effective."

"I suggest that all defense forces

be held in readiness nevertheless," Negutchi insisted.

There was a general movement of assent; Ward's fingers moved smoothly on his communicator, and the world moved from the third to the second state of emergency. From thousands of stations the giant power of ground repulsors hurled squadrons of patrol and battleships into the air. Code signals traveled in a single burst to all patrol stations and ships outside the Earth, and in a few seconds the whole vast, widespread, complex net of the Earth's defense system had been snapped to alert and modifications started to meet the new menace.

ALL HIS LIFE Ward had been trained to transmit messages over his communicator without emotion or concern for the content of those messages, but in spite of himself a thought crept up on him. The Mars defense system was second only to that of Earth; in some ways it was superior, being newer, but it had in no way delayed the scheduled, mysteriously terrifying silencing of the ancient red planet. He glanced quickly around the room, but there was nothing to be learned from the impassive faces of the governors.

What next? Wait? It seemed there was nothing else to be done. Perhaps when the entity approaching them was close enough for their own detectors to contact it, they would get sufficient information to indicate a course of action. The only trouble was that when it got that close it obviously rendered all radiant-power transmission inoperable. No power, no defense, no communication, no anything. Ward felt his fingers slippery on the communicator. He touched it with his other hand. It was damp with sweat. This shouldn't be; it wasn't his place

to worry—that was the job of the governors—but he couldn't help it; this thing touched him too closely.

Ward lived on the power from the great central broadcasting stations; it fed, clothed, sheltered and moved him, conditioned the air he breathed and predigested much of the food he ate. What would the ancestors of his race have done in a case like this? Surely those giants of the past who had risen from the primordial ooze to domination of an entire solar system would have found an answer to any emergency. But then they hadn't been so vulnerable. Deriving their life force from a myriad of sources in the ground on which they lived, they were as durable as a worm that can develop a complete new body from any severed part. The mighty, civilized unit into which humanity had grown, completely impregnable to almost any contingency, was yet capable of being paralyzed by interference with the operation of its central radiant-power broadcasting stations. The vital radiant-power beams were precisely where this new menace was obviously designed to strike.

Suddenly Ward found himself speaking. He shouldn't have been; his business was solely the operation of communications. "Our concentration of power sources is our vulnerable point, but this entity which approaches is also highly concentrated—perhaps more so," he blurted, then started to feel like a fool. His words dropped into the silence of the room without in any way disturbing it. He was completely ignored. He felt like kicking himself. If he had to break all the rules and speak, he might at least have had something worth while to say, not just a childish stating of the obvious. But the thought persisted as the council sat on, seven

silent men who, having done all that could be done, waited for events to take their course. They had nothing further to suggest.

Ward kept his head down, waiting as patiently as he could for some communication to be made. His own words kept recurring to him with maddening persistency. If they were vulnerable because of their concentrated centralization, why then was not this alien being similarly vulnerable? That is, providing some way could be found to strike at the nucleus of its controls. But they would shortly be without power, and without it they could neither get information nor use it if it were given to them. Doubtless the knowledge so desperately needed on Earth was now on Mars, but that was a quarter of a billion miles away across empty space, and power to span the gap could bring no response. The Earth was on its own. Hour after hour slipped smoothly away into the past, a grain of time slipped down through the glass and was gone. The governors sat silent, almost without motion. There was nothing to be done. Every conceivable measure to safeguard the Earth had been put into effect without much hope. There was nothing to discuss. After his single unforgivable outburst, Ward sat as silent as the others, waiting for something to happen.

"If there were only something they could do, something definite against which they could take action. If there were some way they could strike at the focal point of this being's organization—" Ward stopped abruptly at the sound of his own voice. He had been speaking aloud, thinking with his voice. He was treated to a glare of reproof from Myron Stott. The big director in chief would have spoken, but

the light began to fade slowly out of the room.

"It has come," Li Chang pronounced solemnly, breaking the silence with a voice like the sounding of a temple gong.

"We are prepared as well as we can be," Jean Bernard assured him gravely. "The people are calm."

"It will nevertheless come to them as a great shock." It was the usually silent, unobtrusive Ivan Stalski who spoke. "This is perhaps the end of our race," he said fatalistically.

Ward Kane stood up abruptly in the gathering gloom. It was a primitive reaction, instinctive protest against the end Stalski had voiced; danger threatened, he would meet it on his feet. His brain seemed burningly, keenly alive, stripped of inhibitions. His voice cut across the governors' calm acceptance of destiny like the lash of a whip as he leaned forward.

"We must have power to strike," he rasped harshly, his lean, bronzed face intently fierce beneath its mane of jet-black hair. "This thing, whatever it is, may come close enough. We must be prepared to strike at its control center even as it has attacked us."

The smooth, lucent voice of Pindar Brindisi insinuated itself across the stream of Kane's words. "Strike with what?" he asked.

Ward stepped back from the table and turned as though to face an enemy. He was helpless to control his voice, driven by fear that came with the increasing dark. The light was going fast now. He remembered once in his youth there had been a momentary stoppage of power delivery. The sudden avalanche of darkness had been terrifying then, but this slow, inexorable, ominous creeping approach of blackness was infinitely worse. He could barely see

Brindisi across the width of the table. He looked beyond, and his passionate words died on his lips. The automatic light controls were slowly, with the last of the fading power supply, sliding back the window shutters in response to the pressure of light differential. Through the window he could see the capital city of Earth spread in its terraced, towered grandeur, but it was a city he had never seen before. A city of darkness, black, ominous, lifeless, the temperature dropping as its vital power was strangled at its source by the alien mystery from outer space.

"You see, son, there is nothing," Myron Stott's deep voice was peculiarly gentle in the darkness, but Ward wasn't listening. His eyes were fastened on a single pin point of orange light glowing below them, dim by comparison with the blaze of daylight intensity that had banished night from this great city for countless hundreds of years.

"I can see a light," he stated.

"Eh? What?" The sharp question came from Standard. Ward heard his movement as he got to his feet. "Where?"

"There below"—Ward pointed invisibly in the darkness.

"Where's it from?"

"I don't know."

There was a general movement among the others as they crowded around to look.

"It is on the third level," Stott told them. "I didn't know there was any light in the city that didn't draw power from the central broadcasting stations."

"Let us go to it," Brindisi suggested. "There is nothing else to do."

WARD MOVED to the door of the council chamber. He walked straight up to it and bumped his

Revealed at Last!

THE SECRETS OF ANCIENT FORBIDDEN MYSTERIES!

**NOW!
for the
FIRST TIME!**

THE VOW OF SILENCE IS BROKEN!

THE 7 KEYS TO POWER TEACHES YOU ALL THE MYSTERIES OF LIFE from the cradle to the grave—and beyond. It tells you the particular day and hour to do anything you desire, whether it be to the light of the moon, sun, or in total darkness, in accordance with Ancient Teachings. We make no claims ourselves, but the author, Lewis de Claremont, says: "The power to get what you want revealed at last, for the first time since the dawn of creation. The very same power which the ancient Chaldeans, Cuthic Priests, Egyptians, Babylonians and Sumerians used is at our disposal today." He says: "Follow the simple directions and you can do anything you desire. No one can tell how these master forces are used without knowing about this book, but WITH IT YOU CAN MOLD ANYONE TO YOUR WILL."

"From this book," he claims, "you can learn the arts of an old science as practiced by the priestly orders. Their marvels were almost beyond belief. You, too, can learn to do them all with the instructions written in this Book. It would be a shame if these things could all be yours and you failed to grasp them, or were to be blinded by past failures. Don't confuse this book with any other book having a similar name. There is no other book like this one, although many people have tried to imitate it." He says, "It is every man's birthright to have these things of life: MONEY! GOOD HEALTH! HAPPINESS! If you lack any of these three great necessities of life, then this book has an important message for you. No matter what you need, there exists a spiritual power which is abundantly able to bring you whatever things you need. In it you can find the way to all power, the way to GET ANYTHING YOU WANT."

"The SEVEN KEYS TO POWER contains the secret of all real success and REVEALS THINGS YOU NEVER THOUGHT POSSIBLE. Its great author LEWIS De CLAREMONT has a rare gift which comes only to a few, showing things as they should be in their true light. NEVER FAILS TO BRING RESULTS."

OVERCOME ALL ENEMIES!! OBSTACLES & HIDDEN FEARS!

IF YOU ARE CROSSED-IN ANY WAY THE SEVEN KEYS TO POWER SHOWS HOW TO REMOVE AND CAST IT BACK!
THE BOOK PURPORTS TO TELL YOU HOW TO—

Gain the love of the opposite sex
Unite people for marriage
Obtain property
Make people do your bidding
Make any person love you, no matter who
Get any job you want
Make anyone lucky or any gamer
Cast a spell on anyone, no matter where they are

Get people out of low suits, courts.
Seek all misery
Bring happiness to broken lives
Know what others are doing
Gain the mastery of all things
Bring happiness to broken homes
Remove the source of unhappiness
Choose your words according to occasion, holy matrimony
Cheer your desires in the silent tongue

THE ONLY TRUE BOOK OF MASTERSHIP

This is said by the author to be the book from which the old masters gained their knowledge and power and from which they sold limited portions to certain favored Kings, Priests and others at high prices, but never to be revealed under a vow, the violation of which entailed severe punishment.
This book, he claims, shows you the secrets of old which when properly applied, makes you able to control the will of all without their knowing it. If you have a problem and you wish to solve it, don't hesitate. Advertisements cannot describe nor do this wonderful book justice. You must read it and digest its meaning to really appreciate its worth.
Guaranteed to Satisfy or Money Refunded
Only a limited number available for sale, so don't wait. It is worth many times its weight in gold. If you are wise, you will rush your order for this book NOW.
This Coupon is worth \$1.00 to You.

SEND NO MONEY!!

MAIL AT ONCE

SUCCESS BOOK CO.
Dept. 35
23 Park Ave.
New York, N.Y.

SEND NO MONEY

When Postman delivers your Book deposit with him \$1.00 plus a few pennies only for Ten days—if satisfied keep the Book—if not return it and your deposit will be refunded in full no questions asked.

Name
Address
City State P.S.

We will be glad to skip your order on approval—But if you wish to receive a dollar bill or money order we will also send you a Genuine MYSTIC POWER Case of Luck Absolutely FREE!

\$1.00

RUSH THIS COUPON NOW!



face against it before he remembered that with the power off, the electric eye wouldn't open it for him. He found the emergency handle and pushed the door open. They all passed stumblingly out into the pitch-dark corridor and started groping their way cautiously along it. They could hear others fumbling around aimlessly in the dark.

Ward was in the lead. He stopped a moment to get his bearings, and Bernard stumbled into him.

"Shut your eyes and remember," the Polynesian instructed, and in that way they went—Ward, with his eyes closed, leading seven men who were absolutely blind in the darkness.

By little-used, almost forgotten emergency stairs they stumbled and fumbled downward through the huge building. It was half an hour later when Ward finally opened a door and a cool breath of unconditioned air swept over them.

"This is the third level, I believe," Ward said as they stepped into the open.

It was a little lighter outside. He could see the dim shapes of the others as they emerged. Toward the east there was a faint, cold glow outlining the buildings on the skyline. He stopped, and Jean Bernard answered his unspoken question with a low-voiced chuckle.

"That is the Moon rising, my son," he said. "In the islands of my part of the world it is no stranger."

"The light was to our left from the council chamber," Stott spoke out of the darkness, and suddenly Ward knew where the light had come from. It was from the ancient type of globe and filament light that glowed over the doorway of the museum of mechanics. With the sure knowledge of where he was going

to help him, Ward required only a few minutes to lead the board of governors to the museum entrance.

There was a bitter smile on Stott's lips as he stepped into the light.

"I'm afraid you won't find much for defense among these relics of the ancients," he said. Ward didn't answer, but led the way inside.

Others were there before them, drawn by the light in this city of darkness. Just what he had expected to find here Ward didn't know, but something of hope he had had when he first saw the museum light died in him as he left the others and moved disconsolately by himself among the models of the pitifully clumsy apparatus with which the ancients had molded their lives. Without power, they would have to go back to this. The whole museum wing was lighted by the glaring, primitive globe and filament lights. Evidently the field interference that blanketed the radiations of the power-broadcasting stations had no effect on primal wire-transmitted current. He could hear and feel the steady, muffled pounding of the ancient explosion engine that inefficiently generated power for the lights. His wandering took him into the full-size replica of an ancient experimental laboratory of the type used for instruction.

On a table stood the rotating glass disk and drive-crank arrangement of a primitive, hand-operated, static-electricity generator—a Taupler Haltz machine. He smiled as he remembered the first time he had seen this whirling glass disk in operation. He and several others were visiting the museum, and he, as the oldest, had been accorded the honor of cranking the handle of the generator. The others had held hands and stood in line on insulated mats.

They held the terminals of the machine, and the whole group, acting as a condenser, had accumulated a charge of static. He remembered they had spent a whole morning here, waiting for unsuspecting visitors, touching them and discharging the static in a tingling, startling burst of brilliant sparks. Slowly the smile faded from his face.

Whinhurst, Farraday, Franklin, Hertz, the ghosts of these and a dozen others of the ancient pioneers seemed to be with him at that moment, forgotten spirits of men who had died thousands of years ago lived in this room with the simple miracles they had discovered. Ward stayed only a few minutes but it seemed that he had been there for all eternity, that he had tapped some of the fundamental wisdom of the ages. When he left, it was with quiet, sure knowledge of what he was going to do.

He found the governors in the entrance hall of the museum. They stood apart in a silent group, watching the increasing crowd of people who wandered aimlessly about the museum, keeping close to the light. He spoke to them not as a liaison officer, but as an equal. His ferocious intensity, which was the controlled human version of every living irresistible impulse to fight for life at any price, found an echo in these staid, unemotional governors of the Earth. After the first moment of indignation they listened closely.

"It will do no harm to investigate the possibilities of this thing," Jean Bernard said quietly as Ward finished his impassioned tirade.

"First we must know if this thing which approaches will come sufficiently close," Li Chang contributed. "To the observatory," Myron Stott said briefly, turned and went out through the door.

The others followed quickly, and Ward was left standing. He had not

Among the Winners



Bud Van Wyck, Paterson, N. J.
Vincent Abajain, Passaic, N. J.
Junior Porter, Erwin, N. C.
Bill Ramsey, Daytona Beach, Fla.
Walter Seegmiller, Daytona Beach, Fla.
Harold Jeppsen, Minneapolis, Minn.
—and many others.

To win a share of \$265 in cash and prizes

all they had to do was fly a Class C rubber-powered model in a local contest, have the record of the flight attested by the Contest Director and mail it to Street & Smith. We will enter it for the month received in the May to September, 1940, contest, for the following monthly awards:

- 1st PRIZE—\$25.00
- 2nd PRIZE—\$10.00
- 3rd to 10th PRIZES—Model Kit of the Korda-Wakefield World's Champion Model—Value \$1.00 Each
- 11th to 20th PRIZES—Model Kit of the Cahill-Wakefield World's Champion Model—Value \$1.00 Each

GET YOUR CLASS C PLANE FREE

With a year's subscription to ASTOUNDING SCIENCE-FICTION we will send you FREE a "Sun Spot," Class C, rubber-powered, 36-inch wing-spread model kit which is now winning many of the prizes. Full details will be mailed you with your model kit.

STREET & SMITH PUBLICATIONS, INC.
Dept. S-A, 79 7th Ave., New York, N. Y.

Inclosed is \$2.00 for which kindly send me a year's subscription to ASTOUNDING SCIENCE-FICTION and a "Sun Spot," Class C, rubber-powered, 36-inch wing-spread model kit for making the plane which I will enter in the contest for the monthly awards. This offer does not apply to Canada.

NAME
ADDRESS
CITY STATE

expected such prompt action on his suggested. He was forcibly reminded that these governors were in their posts by virtue of ability. He followed at their heels.

THE MOON was rising outside, pouring its ghostly silver light over the vast, darkened city, glorifying it with a black-and-silver artistry that no human lighting engineers had been able to attain. There were many people on the terraces and abroad on the streets and hanging ways, but no vehicle moved. The people wandered aimlessly. There was nowhere to go, their entertainment centers were silent and deserted. It seemed that the strangely assorted group of governors, striding across the fairylike, moonlit silver tracery of the bridge to the city's observatory were the only ones with any purpose.

The observatory, housed in a soaring tower that rose higher than any other building in the city, contained the supersensitive detectors and proximity gauges that would have obtained the last record of the approach of the menace from outer space. It took the board of governors and Ward Kane most of an hour to reach the top of that beautiful, gleaming tower. By that time the observatory tower had lost most of its ethereal perfection, it was merely a succession of countless thousands of steps.

Old John Bartlette and his staff were still at their posts in the observatory. They had all their information neatly tabulated and immediately available. After an hour's upward struggle the governors needed only a few minutes to acquaint themselves with most of the meager information that had been gleaned before the power failed and the de-

tectors ceased operation. The proximity gauges, however, working independently on an infinitely delicate gravity-balance principle, were still recording the activity of the mystery that held them in thrall. It was still approaching; its course had been computed. Within approximately eight hours it would be very close to the city if it maintained its present course and speed.

Myron Stott turned to Ward. "It looks as though your idea may have a chance of getting tried out," he said. "What do we do now?"

Ward stifled the thrill of exultation that surged up in him at this request for advice from the chief of the board of governors. He spoke quickly, the others listened, offered suggestions. For this moment, at least, Ward was a full-fledged member of the council.

Soon people began to move through the city with some purpose. Members of the repair and maintenance crews mostly, men who had not lost the skill of their hands in the centuries of power-given life that lay behind them. The city was combed for materials and tools, the museum of mechanics yielded an invaluable store of the primitive hand tools of the ancients that were in this hour of need being turned to the defense of humanity. The repair and maintenance crews copied these tools but the work was desperately slow, skilled hands were terribly scarce. Most of these were hobbyists.

Old John Bartlette labored at an ancient forge until his hands were raw and bleeding from the handles of hammers and tongs, and his old muscles refused to respond to the indomitable will that drove them. Then Myron Stott took up the tools and his hands became those of old John who directed the shaping and

working of metals. Others came in a constant stream, watched and learned and went to work as best they could. Glass, metals, particularly wire and oxidizable fuel became suddenly precious in this vast, fire-proof city of plastics and synthetics where invisible power beams had, centuries since, replaced all of the cumbersome, primitive power cables and transmission lines.

Hour after vital hour slipped inexorably by and the work, pressed forward by the utmost effort of a million unskilled hands dragged on with maddening, nightmare sluggishness. In the vast reaches of the city Ward struggled, his speed tied down to the rate at which his feet could carry him. With furious intensity he talked, persuaded, threatened and labored among the astonished, incredulous and sometimes indignant

inhabitants of the great metropolis. Once in a while he found a man who understood; soon there were a dozen, fifty, a hundred or more—the leaders. Then came the followers in thousands. Slowly, people were moving in the dark after moonset, groping, stumbling, losing themselves, but moving at last with definite purpose.

THE ETERNAL dawn broke in ageless magic out of the east and spread its cold, gray light over a city almost dead, where mechanical motion had ceased. Seen from afar the feeble, slow, aimless stirring movement of millions of humans was the only hint that anything of life remained in the motionless, magnificent pile as it stood wrapped in its cloak of tremendous, dramatic tragedy.

A little way up in the gaseous

**Say good-bye to wiry bristles—
To beards that look like full-blown thistles—
Use Thin Gillettes—save dough and time!
Four in a pack cost just a dime.**



Top quality at
rock-bottom price

4 for 10¢
8 for 19¢

The Thin Gillette Blade Is Produced By The Maker Of The Famous Gillette Blue Blade

ocean in which the humans lived, the nameless entity that held them in nearly complete paralysis came closer. Millions of eyes stared up at the shimmering ball that dropped slowly over the city. Its outlines were indistinct, as though they merged into other dimensions. It was there, that was all anyone could be sure of. And it was there under tremendous tension. Rays, scarcely visible, rigid with power, extended from it. The greatest reached back into space directly away from the Earth in the direction of Mars, minor filaments of force lanced out toward the power stations of the city; others were directed straight down into the Earth to power stations of other cities scattered throughout the entire world.

The globe itself was small, no more than six feet in diameter, but it radiated a sense of ponderous, tremendously concentrated, delicately balanced power to the huge concourse of humans that awaited its arrival. Slowly and steadily it sank lower over the huge landing station in the center of the city where Myron Stott, Ward Kane and the other members of the board of governors waited.

The great crowd filled the whole vast arena and through it there straggled a continuous, double line of men and women who clutched each other's hand with rigid tensility. They had no idea of the purpose they were to fulfill, their existence as a line was concealed by the surging crowd all round them, but they differed from the rest of the crowd in that they knew something was going to happen, some attempt at defense was planned. Just what it was they had no idea and the half knowledge they held was terrifying in its incompleteness. It was only their greater and more concrete fear of the wild-eyed,

black-haired maniac who had forced them into line that kept them there. At intervals, along the line that stretched out beyond the crowd and disappeared into the heart of the city, an occasional glint of glass and metal showed momentarily between weaving bodies.

The shimmering ball settled with tremendous, slow, smoothly controlled effort to the landing stage. Ward Kane, at the head of the line stretched out his arm, it was gripped solidly by both hands of the man behind. Myron Stott's eyes narrowed, he moved with astonishing quickness, knocked Ward out of his position and took it himself. Kane leaped to his feet, but he stopped at the look of fierce exultation on the face of the director in chief.

"You got to stay behind and clean up after this, son," Stott's deep voice rumbled. "Let's go!" His great voice thundered out above the babble of many tongues.

A ripple of movement passed down the line as the crowd split away from it. Hundreds of thousands of arms were in violent motion. Minutes passed and the activity increased, the vast crowd was hushed in awed and silent waiting. The shimmering globe touched the landing stage and without any cessation of motion started to sink through it.

Myron Stott's bushy mass of gray hair rose slowly until it bristled rigidly away from his head. He breathed faster, his clothes stood straight out. Suddenly his eyes rolled wildly, he writhed and moaned once, then, almost at the limit of his endurance, with the ready assistance of the men behind, who held him rigidly locked to the living line, he yelled in defiance and hurled himself forward onto the globe.

There was a tremendous, blasting

leap of annihilating fire as the primitive torrent of static electricity, generated by hundreds of thousands of ancient, hand-driven, static-electric generators and stored in the vast condenser composed of a million insulated human bodies, ripped irresistibly to ground. Myron Stott and half a hundred other selfless heroes on the discharge end of the living condenser were battered and smashed, split and torn into death on a bursting wave of agony.

The inconceivably tensioned delicate balance of forces within the globe was disturbed a few minute degrees. It was enough. The complete blanketing of a single power station was withdrawn for a few seconds. During that brief moment half a dozen batteries of force projectors smashed their beams into the globe. The impact of their power released another station. The barrage of force was increased, doubled, built to a terrific climax as every power station in the city poured its tremendous reserve of energy into the fragile-looking, six-foot globe. Then suddenly it wasn't there. It had reached the limit of its capacity to endure and was blasted out of existence. The force beams crossed and flamed madly at their intersections for a moment before the automatic controls cut off the power.

TWO-HUNDRED FEET away from the wreckage of the landing stage where he had been hurled by the first blast, Ward Kane got dazedly to his feet. Someone helped him. It was a grizzled commander of a defense squadron.

"We got him tagged," the commander said grimly. "He's got no

defenses, figured he didn't need them, I guess."

Other men were coming as power poured through the city and it lived once more. Technicians scrambled and crawled over the smoking, still hot, ruins of the landing station. With delicate instruments they probed and searched into the nature of the mysterious invader that had been so completely eliminated. Then they were leaving, their eyes inwardly intent on the knowledge they had gained. Ward caught snatches of their talk. Variable power wave lengths would make the Earth power stations immune. With that power reserve, attack would be simple. The thing wasn't exactly a being in itself, it was more a tool, incapable of thought.

Ward leaned wearily against a wall, utterly worn out with the hours of unaccustomed action that lay behind them. The Earth that had come so close to disaster was suddenly very dear; he felt infinitely grateful for the life that magnificent old Myron Stott had bequeathed to him. Someone touched him on the arm. It was a messenger from what was left of the board of governors.

"The governors want to know if you have any suggestions for further action," he said.

"I will go to them," Ward answered and started toward the administration building. They would need to get the cleaning up started. One small corner of his mind wondered worriedly who would operate the communicator for the council from here on.

The ghosts of the ancients faded contentedly back into the past, satisfied that the birthplace of their race was still in good hands.



BRASS TACKS

Hubbard wasn't arguing forms of government. Feudalism did spring from bandit-soldiers. Hubbard's point was that it would.

Dear Sir:

Normally I am not a writer of letters to the editor, but there are implications in the ending of "Final Blackout" which seem to me to demand comment. They all may be summarized in one statement: it is anti-democratic. Of course the social aspect of an adventure story is not to be taken too seriously, but when such a question as that of a proper political organization appears, we have the right to demand a really unbiased treatment, not merely a generalization following the "personal devil" theory of sociology.

In advance I shall freely admit that democracy has many faults. It is changeable, short-sighted, and undecided, with the foreground crowded with politicians racing madly about trying to put themselves in front of a "movement." At its best, under such a leader as Pericles, it must be constantly guided and watched; at its worst, it becomes a lynching party. It is not surprising that so often the ultimate result has been what may be best termed "fascism" in its broadest sense, that is, Caesarism, military rule, and authoritarian government generally. There is much truth in the statement that democracy is a government for good times.

Yet we dare not ignore the ultimate effects of authoritarianism. Augustus gave Rome better government than she had had for generations—but there was no second Augustus. After all, the Nazi state is merely Plato's Republic with a set of ideals of intelligence. Those who support such a type of organization usually do so because they feel that when the best fitted are selected for special privileges, their many virtues will automatically qualify them. So often they suffer the fate of Fritz Thyssen.

The Lieutenant's government was quite definitely feudal. It rose in the same manner as the medieval feudal organization—political authority was given to the "bearers of the sword." Remember that *count* and *duke* were military titles of the later empire. I agree that this would likely be the result of a generation of total war. I concede that a ruling class tried in the fire might very well be the best obtainable. I take no offense at the "American politicians," caricatures though they be. My complaint is that nobody spoke up something like this: "Granted that you are a good ruler, Lieutenant; who is going to succeed you? Who will rule England after this war-generation of leaders is gone? Feudal states degenerate rapidly. A dictator is justified only when he acts as a schoolmaster for his people. Eventually the sovereignty must be returned to them; for by no other means can a selection of the

best fitted in spite of birth be maintained, and it must be maintained because so many desirable characteristics are Mendelian recessives. The sword must yield to other methods of decision, because new facts concerning all matters we decide continue to appear, yet death cannot be reversed." Such a statement would put the individual tragedy—which I admit—in its proper relation to the general principles of government, and would not leave the reader with the belief that it was an unjustifiable and unalleviated tragedy.

May I thank you for publishing stories which really do stimulate thought, instead of "costume" Westerns.—Joseph M. Wilson, Box 183, Gridley, Illinois.

Long-time survey.

Dear Mr. Campbell:

At the moment I own seventy-two issues of Street & Smith's Astoundings. This may not seem large, in view of the years Astounding has been extant, but it gives me a good opportunity to value each new issue in the light of all past issues. Since I keep records of Astounding since January,

1934, I am obliged to put some thought into its development and properties past and present. I can give you the best idea of my views as to present properties by an analysis of the June issue just as I read it.

The cover, while not the best in my opinion, was yet undoubtedly the best advertisement for Astounding you have ever put out. If you ever find a better man than Rogers, you can expect him to turn into a Stuart "monster" any old time, or exhibit similar signs of superhumanity. Although the solid title strip cuts down on picture space, it is the first step toward subjugation of the cover. Although I hope you don't try your *Unknown* experiment on Astounding; so far, very good.

Schneeman's work for "The Roads Must Roll" is among his poorest. The red smear idea doesn't help it any, either. Although I agree that he did his best work with his old technique—remember "Deserted Universe"?—either style, when he puts enough work into it, is tremendously dramatic. His work for "Gray Lensman" was the only possible type that could stand up against Dold's tremendous productions for "The

MR. BOSTON SAYS: "RARE ENJOYMENT FOR YOU IN MY APRICOT NECTAR!"



HERE'S A DRINK THAT
TASTES LIKE MORE—
THE SORT THAT WINS
YOU FRIENDS GALORE!

A Beverage Liqueur prepared by Ben-Burk, Inc., Boston, Mass.

For the delicious tang of fresh apricots—in a hearty liquor—try Old Mr. Boston Apricot Nectar! Drink it straight. You'll find a handy drinking cup tops each pint bottle. It's "rich as brandy, smooth as honey."

OLD MR. BOSTON APRICOT NECTAR

ALSO BLACKBERRY • PEACH • WILD CHERRY—70 PROOF



Home-Study Business Training

Your opportunity will never be bigger than your preparation. Prepare now and reap the rewards of early success. Free 64-Page Books Tell How. Write NOW for book you want, or mail coupon with your name, present position and address in margin today.

- | | |
|--|---|
| <input type="checkbox"/> Higher Accountancy | <input type="checkbox"/> Business Mgmt |
| <input type="checkbox"/> Mod. Salesmanship | <input type="checkbox"/> Business Corres. |
| <input type="checkbox"/> Traffic Management | <input type="checkbox"/> Expert Bookkeeping |
| <input type="checkbox"/> Law: Degree of LL. B. | <input type="checkbox"/> C. P. A. Coaching |
| <input type="checkbox"/> Commercial Law | <input type="checkbox"/> Effective Speaking |
| <input type="checkbox"/> Industrial Mgmt | <input type="checkbox"/> Stenotypy |

LaSalle Extension University

Dept. 866-R

A CORRESPONDENCE
INSTITUTION

Chicago

New! Lifelike!



PHOTO-RINGS

NEWEST SENSATION! Send any snapshot or photo and we'll reproduce it in this beautiful any-size ring.

Special

45c

Indestructible! Waterproof!

(Hand-painted

Recess strip of paper for ring size. Per postman plus a 10c extra! Few cents postage. If you want postage FREE PHOTO RING CO., Dept. 55-3 P.O. Box 14, Cincinnati, O. (Canadians Send Money Orders)

ITCH STOPPED in a Jiffy -or Money Back

For quick relief from itching of eczema, pimples, a thlete's foot, scales, scabies, rashes and other externally caused skin troubles, use world-famous, cooling, antiseptic, liquid D. D. D. Prescription. Greaseless, stainless. Soothes irritation and quickly stops the most intense itching. 35c trial bottle proves it, or money back. Ask your druggist today for D. D. D. PRESCRIPTION.

SELL FOOD

Samples on Trial Plan
Everybody must buy food. Own a steady neighborhood route. Full or part time. Make money at once and all year round. Complete outfit, including large assortment of regular full size products—worth \$9.00—on amazing trial plan. No experience needed. Handle nationally known line 100 guaranteed home necessities! Fastest growing, steady business. Liberal credit plan. Old reliable company. Write quick for me Free Offer.

E. J. MILLS

1849 Monmouth Ave., Cincinnati, Ohio.



HOW TO Write Stories that SELL

Mrs. Grace Blanchard had an IDEA for a story. We criticized her story, gave it a new title and told her WHERE TO SEND IT. She got a substantial check THE FIRST TIME OUT. That is a THRILL many of our graduates have each month. Let 22 years of experience guide YOU. Endorsed by Jack London. "THE ART OF STORY WRITING"

FREE BOOKLET with explanation of our personal criticism and manuscript sales service. No obligations. Write! HOODIER INSTITUTE, Room 120, Hoodier Bldg., Chicago, Ill.

SONGWRITERS

and GUARANTEED PUBLICATION

FOR ACCEPTED LYRICS, MELODIES,
OR YOUR OWN COMPLETE SONGS!

A MINIMUM OF

\$1,000.00

ADVANCE ROYALTIES

For Full Details Write for
SONG HIT BUILD INC.
DEPT. 55
1615 B'way, N. Y. C.

Skylark of Valeron." Yes, I still miss Dold. As for the story itself, Heinlein hasn't fallen below his standard yet. That is intended to cover his strong characterization, realism, logic and ingenuity, all of which are considerable.

For some reason, "Deputy Correspondent" proved to be very readable and amusing. The wild, rather impersonal style helped a rather musty plot-form. Kolliker, although without much technical ability, seems to be an idea man. As such I hope he crowds out R. Isip. I grind my teeth over most of his productions, and his work for "The Carbon Eater" was no exception. His forte seems to be a large and active crowd of people nowhere in particular doing nothing discernible. I suppose that's a safe way to stick to my story.

The story itself, while its plot belonged somewhere back in the dark ages of 1930-33, was at least well portrayed. That fact makes comparison hard. Five years ago, the idea was the whole thing, and when someone like Stuart, with a style far better than the present average, showed up, he won by a couple of avalanches and an earthquake. Now it's not so easy to separate the two. Let's say this one was not so hot, merely in hopes of something better.

"Unseen Tools" was a veritable gem among articles, better than Van Dresser's worthy contribution. It cleared up a lot of misconceptions I had about advanced mathematics, and gave a lot more respect for the supremely free-thinking mathematicians who are needed to forge those tools.

As a pure job of writing, "The Testament of Akubii" stands out over all others, as does everything else Knight ever wrote. He packs more real science-fiction and concentrated dramatic essence into five or six pages than anyone else has yet approached. The announcement of his new serial is the best of the year, as was his last serial.

"Final Backout" is the best issue of the three. Hubbard surpasses everything but "The Dangerous Dimension" this time. Schneeman is back up to par again, too.

I haven't tried to cut this epistle down to Brass Tacks dimensions, as about six years' worth of opinions just don't fit in. It's really a strain to stop here, as I really would prefer to go over all previous issues about twice as exhaustively. Perish the thought!—Dick Wortman, 842 East 97th St., Seattle, Wash.

Wonder how long it'll be before the totally deaf get real mechanistic ears?

Dear Mr. Campbell:

This letter is intended to be a special compliment for Lester del Rey and his

story "Reincarnate." I do not mean to say that it is the best story in that particular issue—"Final Blackout" and "Admiral's Inspection" rank higher, in my opinion—and my compliments do not even go to the story itself, good and well written as it was. My congratulations go to one thought embodied in that story: the thought that in connecting a living brain with artificial sense organs there is no need to worry too greatly about attaching which wire to what nerve ending. This thought which one day may be put to the test by actual experiment and will then, in all probability, pass that test, seems to be entirely new. At any event it is important and logical and should be remembered—which is the reason for writing this letter. Let the microphone which serves for the destroyed ears receive and transmit the sound impulses to the brain—as long as these impulses arrive approximately in the area of hearing so that they are still "heard" the brain will interpret rightly. If they arrived somewhere else in the brain it could probably manage too, but that is an unnecessary complication which would not occur in surgery.

A surgeon could be trusted to pick the right nerve-bundle, but of course he could not pick the right fiber in that bundle. This complexity of nerve-bundles has often worried physiologists that were imagining such operations, but there is no need to worry. Adaptation will be required, but the brain is well equipped to handle such matters; as far as it is concerned, the task is much less difficult than the learning of a foreign language. The sound "cool" may arrive as "pr-r-blung," but once the brain knows that, the troubles are over. It only has to learn new and strange sounds, not new and strange sounds *and* a different sentence structure *and* a different way of saying things *plus* unfamiliar and complexly conditioned shades of meaning. In the case of the replacement of a single sense-organ—actual experiments would not start with a complete robot—the brain *only* has to interpret a new set of sounds. That should not take long and the comparative simplicity of these facts permits an optimistic outlook.—Willy Ley, 304 West 24th Street, New York City.

"The Idealist" is the first of a series.

Dear Mr. Campbell:

In this, the July issue, Heinlein's sequel is the first in preference. Although lacking the originality and spice of the first install-

ment of "If This Goes On," this interesting and very human novelette had far more desirable qualities than did the last installment of its predecessor, which dragged and became too entangled in superfluous wordage and explanation. Orban did exceptional illustrations for this story, and was quite a surprise all around with his fine new style of art. All of his pictures this issue were the best.

Speaking of art, although every new cover by Rogers is a real thrill, as the "Crisis in Utopia" one this month is, still I would enjoy seeing something from Schneeman, Wesso and some of the others again. Rogers is one bad habit I enjoy though, and I would have appreciated seeing something by him on *Unknown* covers before the change.

Knight's story has gone unread due to my new policy of reading serials in one dose, so no criticism is forthcoming, but I will say that it looks grand and that the Isip pics aren't bad. If handsome folk are under the sea as Rogers seems to think, it's under the sea for me.

"Red Death of Mars" is interesting because of its old-time stf. plot. This is not the type now being extensively used in Astounding Science-Fiction and was a treat for a change, especially with those grand Schneeman illustrations. Has he at last returned to the art that distinguished him a year or two ago, I wonder? Let us hope so. The smooth work is much preferred to the hen tracks, even if he was beginning to master that style in "Space Patrol" and "Hindsight."

"The Idealist" is No. 3 and quite good with new ideas and interesting characterization and background. But what a shame to turn Page 107 and find a new article instead of continued action in the von Rachen short. The end was too sudden and I should like to have a sequel to find if the idealist accomplished his imagined aims.

"Dark Mission" is fifth because of old plot and "Emergency Landing" is last due to its brevity.—Charles Hidley, New York, New York.

"Slam!" will make that four in a row!

Dear Mr. Campbell:

As one who has read every copy of Astounding under its various changes of ownership and editors, allow me to say that the 1940 Astounding is the best yet. You certainly started the year off with some fine serials. I never expect to see three such fine stories as "Gray Leansan," "If This

Gees On," and "Final Blackout" appearing so close together again.

Then, too, it seems to me that there has been a recent trend to the use of psychology in stories. That is, more stories have dealt with men's minds and their reactions to various events—rather than emphasizing exciting action quite so much. As examples of this let me cite such masterpieces as "Cold," in which Schachner proved conclusively to his critics that he can still write; "Repetition," van Vogt's best and a story which didn't get enough praise (how anyone could rate Del Rey's "Reincarnate," unbelievable and implausible hodgepodge that it was, above this yarn is beyond me); and "And Then There Was One," which—science or no science—was a thoroughly delightful tale. I hope this type of story keeps coming.

"Final Blackout" ended masterfully. I really had no idea that Hubbard was capable of such writing. It is a classic. In the May issue I thought "Hindsight" was a little gem and deserved the appellation of "Mutant" just as much as the same author's "Legion of Time" did. To me it was a most intriguing theory about time travel.

Rogers' July cover is different from his usual style. I thought it was a Virgil Finlay painting at first. It is one of your best covers, though, but I don't like to see one artist used on every cover. The two-color illustrations are effective and I hope to see more of them.

The best story in the July issue is "Dark Mission." Second place goes to "Coventry," and "Crisis in Utopia" and "Red Death of Mars" are tied for third. Heinlein's latest is spoiled by the trite ending. I thought Heinlein was more original and ingenious than that. Knight's new serial starts out rather slowly but may improve next month. Williams' yarn is based on a very hackneyed theme, but is well written.

"Emergency Landing" belonged in *Unknown* if anywhere. "The Mosaic" was quite similar to Nat Schachner's "Ancestral Voices" several years ago. DeCamp's new article is interesting, but I wish he'd stick to stories; he can write such good ones. And please limit the articles to one.

Incidentally, R. Lipp's drawings for "Crisis in Utopia" are punk.

The two best of your recent discoveries are Robert Heinlein and A. E. van Vogt. Keep them both coming.

And please do something about those illustrations.—Donald V. Allgeier, 605 East Page Street, Springfield, Missouri.

SCIENCE DISCUSSIONS

More still-nameless sciences—

Dear Mr. Campbell:

The van Dresser article, "Introduction to a Nameless Science" inspires me to make some remarks about a number of other unnamed, and undeveloped sciences that a few scientists might profitably get down off their high horses to investigate. It works this way:

Witchcrafts are those technologies which originally developed by rule-of-thumb methods, are followed slavishly on the principle of "don't monkey with it while it works," and are explained on the basis of supernatural forces. Science consists of those technologies developed by the experimental method, refined on the principle that simplification is usually possible, and explained on the basis of supposedly logical theories. (Supposedly: chemistry was a science in the days when it was believed that all acids contained oxygen. The theory was cockeyed. Many of our present structures of logic—notably atomic structure theories—are whacky, but haven't been improved yet.)

Witchcraft is scorned by every self-respecting scientist—until said scientist runs up against some aspect of witchcraft that throws him hard and keeps him thrown. Then suddenly he gets that answer, says "Poh-poo! Wasn't witchcraft at all; just good, sound science hidden under meaningless mumbo-jumbo. Witchcraft? There's nothing in it—a lot of silly superstition."

Then witchcraft throws him for another loss, he goes to work, and eventually untangles the mumbo-jumbo, finds an answer acceptable to him that he can make work, and reiterates that witchcraft is "all silly superstition." Except, of course, the few odds and ends of witchcraft that he's learned how to work and hence are, by definition, not witchcraft but science.

As our friends, the politicians, say—let's look at the record.

Item: Local superstition to the effect that people who got cowpox from milking cows didn't get smallpox. (A doctor finally got around to it, gave it a Latin name, and saved countless millions of lives with vaccination.)

Item: An old witch woman had a wonderful and fearful concoction of vegetable products and other things, a fearsome, ill-smelling and worse-tasting stew which

would, so local superstition claimed, cure dropsy. (A doctor, who was losing patients because the witch woman *did* cure dropsy and he couldn't, finally figured he'd better find out about it or starve. He found out, eliminated the inert materials, and wound up with digitalis, which has saved more hundreds of lives.)

Item: Chinese physicians had a number of weird and wonderful concoctions in their pharmacopoeia, among them being toad skins for dropsical patients. (Chalk one up for the Chinese physicians. Toad skins contain a substance designed to protect the toad by being poisonous. There isn't enough to kill a man, but it will cure his dropsy!)

Item: The Chinese also had a weird vegetable stew designed for aiding those who suffered with colds—it was supposed to clear out the nose. Pure superstition—until Western medicine extracted the ephedrine from it, found it *would* clear noses, added an explanation, and started using it on hay fever and in hundreds of other uses, too.

Item: The South American Indian witch doctors had a whole collection of mumbo-jumbo witchcraft stews. Western civilization was forced, rather early in its contact with them, to admit—despite its reluctance—that the blasted witch doctors definitely had something. If they didn't admit it, they died just as dead when a curare-coated blowgun dart stuck them. Death being a rather undeniable sort of thing, the "taint so" boys were forced to do a little investigating, coming up triumphantly with the scientific explanation that took all the witchcraft out of it. Curare is an alkaloid which is capable of paralyzing the motor-nerves that tell muscles to work, thus making it impossible for the brain to make the heart and lungs work.

That, incidentally, satisfied them for some eighty years. There was no witchcraft—it was just science. Unfortunately, somebody pointed out that curare would, because of its paralyzing powers, (a) prevent tetanus convulsions, giving antitetanic serum a chance to work before the patient died of convulsive exhaustion, (b) prevent strychnine convulsions, and so act as an antidote, (c) prevent the terrible convulsions induced by metrazole, and hence permit metrazole to be used in treating the insane without having the violent muscular convulsions which would break bones, rip muscles, generally maul, and frequently kill the patient, and, (d) end the uncontrollable though mild spasms of spastic paralysis and thus permit a cure of that dread affliction.

Now the science boys are face to face with the unpleasant fact that they have a

THE LITTLE WONDER OF THE TYPEWRITER WORLD . . .



THE NEW

CORONA
Zephyr

NOTE FEATURES

SWINGING SHIFT

84 CHARACTER
STANDARD
KEYBOARD

BACK SPACER

WEIGHS ONLY 9 lbs

FITS INTO DESK
DRAWER

ONLY

\$29.75

COMPLETE WITH CASE

MAIL THIS
COUPON FOR DETAILS

L. O. SMITH & CORONA
TYPEWRITERS, INC. Desk 8,
707 E. Washington St., Syracuse, N. Y.
Please send me free folder describing
Corona Zephyr.

Name _____

Address _____

City _____ State _____

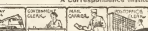
LAW

STUDY AT HOME

Legally trained men win higher positions and bigger success in business and public life. Greater opportunities now than ever before. Big corporations now loaded by men with legal training.

More Ability: More Prestige: More Money

We guide you step by step. You can train at home during spare time. Degree of LL. B. Successful graduates in every section of the U. S. We furnish all text material, including 14-volume Law Library. Low cost, easy terms. Get our "Inside Co.-pass" Law Training for Leadership" and "Business" books FREE. Send for them NOW.
LaSalle Extension University, Dept. 885-L, Chicago
A Correspondence Institution



START \$1260 TO
\$2100 YEAR

MEN—WOMEN. Write immediately for free 32-page Civil Service book, with list of positions and full particulars telling how to qualify for appointment.

FRANKLIN INSTITUTE
Dept. G184, Rochester, N. Y.

U.S.
GOVERNMENT
JOBS



DIGESTIVE JUICES FAILING?



Then Food CAN'T Digest Right, Your Strength Goes—You Feel Rotten, You Look Older . . . Start those Digestive Juices Flowing Normally Again

If there is nothing organically wrong with you, a common cause of poor digestion is a **WREAK** flow of DIGESTIVE JUICES. Then food can't digest right. You feel SOUR, often have HEARTBURN, gas, a DIZZY head.

You must do something to start digestive juices flowing NORMALLY again. Set the millions of tiny cells in Fleischmann's Yeast to work on those digestive glands. This yeast is a **STIMULATOR**. It starts the juices forming faster. Then digestion should pick up—in test cases it was greatly increased. When digestion improves, strength should begin to come back so that you feel like a NEW person. Get Fleischmann's Yeast today! Eat one cake first thing in the morning, another 1/2 hour before supper.

FREE—Write for "You Can't Feel Well If Digestive Juices Are Failing," to F. Y. Co., Dept. B-8, 691 Washington St., New York. Absolutely **FREE**

Copyright, 1940, Standard Brands Incorporated



Classified Advertising

Patents Secured

INVENTORS—Don't delay. Protect your idea with a Patent. Get Free Patent Guide. Write Clarence A. O'Brien, Registered Patent Attorney, 6351 Adams Building, Washington, D. C.

PATENTS—Reasonable terms. Book and advice free. L. F. Ransfield, Dept. 513, Washington, D. C.

INVENTORS—WE SUCCESSFULLY SELL inventions, patented and unpatented. Write us, if you have a practical useful idea for sale. Chartered, Institute of American Inventors, Dept. 42, Washington, D. C.

PATENTS SECURED. Two valuable booklets sent free. Write immediately: Victor J. Evans & Co., 563-K Victor Building, Washington, D. C.

Detectives—Instructions

DETECTIVES EARN BIG MONEY, WORK HOME, TRAVEL. DETECTIVE particulars free. Experience unnecessary. Write GEORGE WAGONER, 2649-A Broadway, New York.

DETECTIVES—RECRUIT INVESTIGATIONS—TRAINING, Home—Travel—Fingerprints—Particulars Free. Chief Mallick, 577-S Ophidian Building, Jersey City.

Old Gold & Money Wanted

GOLD—\$35 OUNCE. Ship old gold teeth, crowns, jewelry, watches—receive cash by return mail. Satisfaction Guaranteed. Free information. Paramount Gold Refining Co., 1559-G Hennepin, Minneapolis, Minn.

Photo Finishing—Developing

ROLLS DEVELOPED—25c roll. Two 5x7 Double Weight Professional Enlargements, 8 gloss prints. Club Photo Service, Dept. 17, La Crosse, Wis.

8 ENLARGEMENTS—Slits developed plus 2 enlargements, 25c roll—116 or smaller. Enlarge Photo, Box 791, Dept. SS, Boston, Mass.

AT LAST! ALL YOUR SNAPSHOTS IN NATURAL COLORS. Roll developed, 8 Natural Color Prints, only 25c. Reprints, 3c. Amazingly beautiful. Natural Color Photo, Janesville, Wisconsin.

Snapshots, Roll, FINISHED 25c (16 prints or eight enlargements). Speedy Service, Box 44-S, Wilkes-Barre, Pa.

ROLL DEVELOPING. 36 Velox prints 25c. Dividend Coupon, 3c reprints 25c. Willard Studios, Box 3535C, Cleveland, Ohio.

Correspondence Courses

CORRESPONDENCE COURSES and educational books, slightly used. Sold, Rented, Exchanged. All subjects. Satisfaction guaranteed. Cash paid for used courses. Complete details and bargain catalog Free. Nelson Company, 599 Sherman, Dept. J-215, Chicago.

Help Wanted—Instructions

M. M. EARNED \$1174 in spare time for exceptional "cellar crew." Know-king mushrooms! Free Book tells if your cellar, shed suitable. We buy crops. United, 3848 Lincoln Ave., Dept. 531, Chicago.

BECOME AN EXPERT ACCOUNTANT

Executive Accountants and C. P. A.'s earn \$2,000 to \$10,000 a year. Thousands of firms need them. About 20,000 Certified Public Accountants in the U. S. We train you thoroughly at home in spare time for C. P. A. examinations or executive accounting positions. Previous experience unnecessary. Personal training under supervision of staff of C. P. A.'s, including members of the American Institute of Accountants. Write for free book "Accountancy, the Profession that Pays." **LaSalle Extension University, Dept. 865-H, Chicago**

A Correspondence Institution



Sawtooth Harry Says:
TWENTY GRAND RAZOR BLADES are Habit Forming

Brother... don't you
Never try a Twenty
Grand Razor Blade!
They're HABIT

FORMING. Once yuh feel the perfect leather-stropped edge again yer face, yer doomed. Yuh won't be able to get along without 'em. Keep away from them self-help displays in drug and other stores in your neighborhood.



WORLD'S PRODUCTS CO., Spencer, Ind.

hice explanation but no supply. The witch doctors—pure superstition and blatherdash!—can make curare; they can't. Science having been very thoroughly and irrefutably thrown flat on its snobbish face is moving, somewhat ponderously and reluctantly, to investigate the phenomenon. (Whaddya wanna bet it comes up with a scientific explanation, and the remark that "witchcraft is pure superstition and hokum. Oh, they stumbled on one or two things, but there's nothing to such silly superstition." Wonder how long it'll be before they get tired of that chant?)

Oh, I forgot. These same South American witch doctors also had a most horribly vile-tasting stew they made from the bark of a Peruvian tree. Local superstition said it would cure malaria, though. Funny thing is, quinine was one of the two curative things known to man up to the recent sulphanilamide series. It cured malaria. Neosalvarsan could cure syphilis. Then we had a whole bunch of palliatives that eased things till the body had a chance to cure itself. That makes one for the witch doctors, one for the scientists, and the recent sulphanilamide series makes it two for the scientists. We don't know what else the witch doctors have.

However, the witch doctors had an insect killer the scientists are now producing commercially, a fish-stunning compound that wasn't sporting, but certainly was a great idea if you were trying to live on fish, and not merely be amused by them. (It permitted the unwanted, undersized fish to recover and grow up.)

I propose a Society for the Understanding of Witchcraft. The record indisputably shows that the witchcraft practitioners have some immensely valuable truths. The fact that those truths are mixed up with a lot of untruths no more invalidates them than the fact that the extract of Peruvian tree bark was extremely impure quinine kept it from curing malaria.

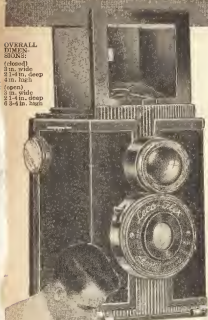
I have discussed only physical things—and, naturally, already known-and-explained things. (There's a report that the witch doctors can soften human bones so they become pliable and can be reshaped without killing or injuring the patient that needs some attention.) But even more, our weakest of all sciences, psychology, needs a lot of help from the race's oldest practitioners. They'd be much hurt at the suggestion, much troubled by the implications, but much benefited by the study if psychologists would go to school under some good South African or South American witch doctors. *Those boys have something!*—Robert Tarrant, 131 Park Avenue, Hoboken, N. J.

Magazine Exchange
3. Washington Avenue

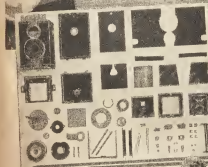
Magazine Exchange
Washington Avenue

ASSEMBLE THIS FINE *LensKit* REFLEX CAMERA AT HOME...YOURSELF...FOR ONLY

OVERALL
DIMEN-
SIONS:
(closed)
3 in. wide
2 1/4 in. deep
4 in. high
(open)
8 in. wide
2 1/4 in. deep
6 3/4 in. high



EASY TO ASSEMBLE.
Instructive for beginners.
A fine extra REFLEX
for advanced
amateurs at
low cost.



LENSKIT includes
everything from
necking to screws.
You too what
you snap when
you look down
into viewfinder.
Copyright 1940
LensKit
Products Co.,
Inc.



**It's Easy!
It's Thrilling!
It's Instructive!
It's Fascinating!**

**Putting a Precision Camera Like This Together
is More Fun Than Any Hobby You've Ever Enjoyed**

IF YOU are the kind of fellow who gets a big "kick" out of making useful, clever things with your own hands all by yourself... If you think taking pictures is fun... Just imagine the pleasure of taking pictures with a camera **BUILT WITH YOUR OWN HANDS!**

Words can't describe the thrill of seeing this fine, modern double-lens reflex "know" under your very eyes as you assemble the precision LensKit parts one by one. And the fun of assembling is just the **BEGINNING!** The 12 sharp, clear, 2 1/4" x 2 1/4" pictures the LensKit takes on each roll of Eastman 620 or Agfa PR20 film will delight you for years to come. Your friends won't believe they were taken with a camera you built yourself.

NO EXPERIENCE NEEDED

No complicated tools are required. To enjoy this fascinating hobby all you need is: simple tools, patience, and the ability to follow the simple step-by-step instructions included with each LensKit. Your kitchen table can be your workbench.

NOT A TOY—BUT A REAL PRACTICAL CAMERA

Ask any expert... he'll tell you the twin-lens reflex is the coming trend. It's simpler to operate... the full-picture-size upright image on the ground glass view finder shows exactly how the picture looks when you take it. Even a small child can snap pictures with a LensKit camera.

Here Are Some of the Features of the LensKit Reflex (the kind you usually look for on much more expensive cameras):

- One-Piece Die-Cast Metal Housing
- Simple, Positive-Acting Rotary Shutter
- Multi-Dimensional Fixed-Focus 75-mm Meniscus Lens
- Two Viewfinders: "Eye-level" for fast-moving objects; also separate, upright-image, brilliant ground-glass finder for critical portrait or snapshot photos.
- YOU SEE WHAT YOU GET BEFORE SNAPPING THE PICTURE.
- Tripped Socket with Standard Thread
- Separate Brilliant Viewfinder Lens
- Leather Carrying Strap
- Two-Way Exposure: Snap or Time.

THE "BUILD-IT-YOURSELF" LENSKIT

includes everything you need... all precision-made parts, including completely assembled shutter unit; simple detailed drawings and comprehensive easy-to-understand assembling and operating instructions; all for only \$3.95, postpaid.

SATISFACTION GUARANTEED!

Send for your LensKit today! Enjoy the fun, the fascination, the thrill of building this useful, modern precision-made reflex. Think of the pleasure you'll get out of taking sharp, clear, perfectly-framed negatives that can be printed 2 1/4" x 2 1/4" by contact, or enlarged 20 diameters or more.

The complete LensKit is only \$3.95, postpaid, when remittance in full accompanies your order. If you prefer, you may send only \$1.00 and we will ship your LensKit C.O.D. for balance, plus mailing charges. You save the mailing charges when you send cash in full. All parts in the LensKit are guaranteed against defects in material or workmanship for one year.

LensKit
TRADE MARK

LENSKIT PRODUCTS COMPANY, Inc., 435 N. Michigan Ave., Dept. 50, Chicago

FILL OUT AND MAIL THE CONVENIENT COUPON BELOW!

LENSKIT PRODUCTS COMPANY, Inc.,
435 North Michigan Avenue, Dept. 50, Chicago, Illinois
Gentlemen: [] I enclose \$1.00 for the complete LensKit. Send C. O. D. for balance, plus a few cents mailing charges.
[] I enclose remittance in the amount of \$3.95. Please send me postpaid immediately the complete LensKit.

NAME _____

ADDRESS _____



THE ALEXANDER TWINS...Dorothy
and Grace, Famous Drum Majorettes
for American Legion Post 42, Martins-
ville, Virginia

SALUTE YOU

AND SALUTE

Chesterfield

**FOR REAL MILDNESS
AND BETTER TASTE**

These are the twin pleasures you look for in a cigarette. You'll find them in every Chesterfield you smoke...and it takes the right combination of the world's best cigarette tobaccos united in Chesterfields to give you the added pleasure of a cooler smoke...*Make your next pack Chesterfield and join the millions of smokers who say*

They Satisfy